Rock Products

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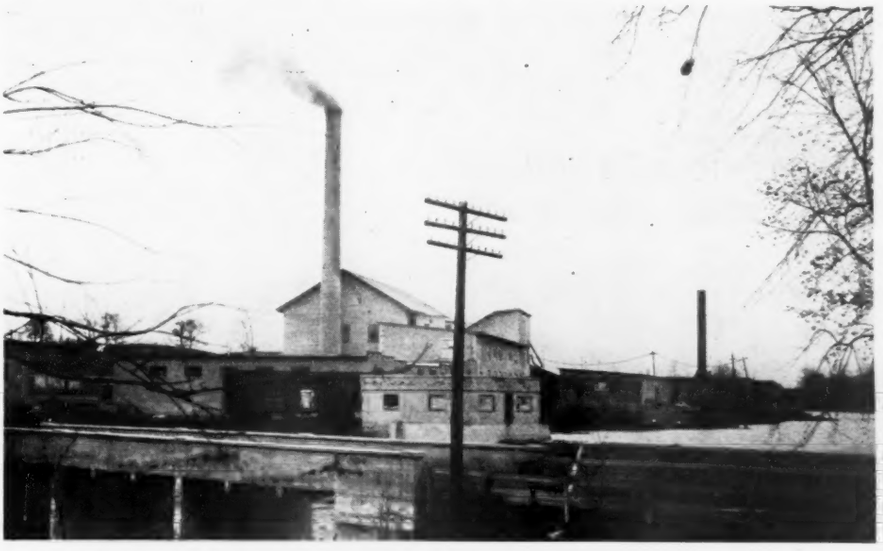
The New Ebsary Gypsum Plaster Plant

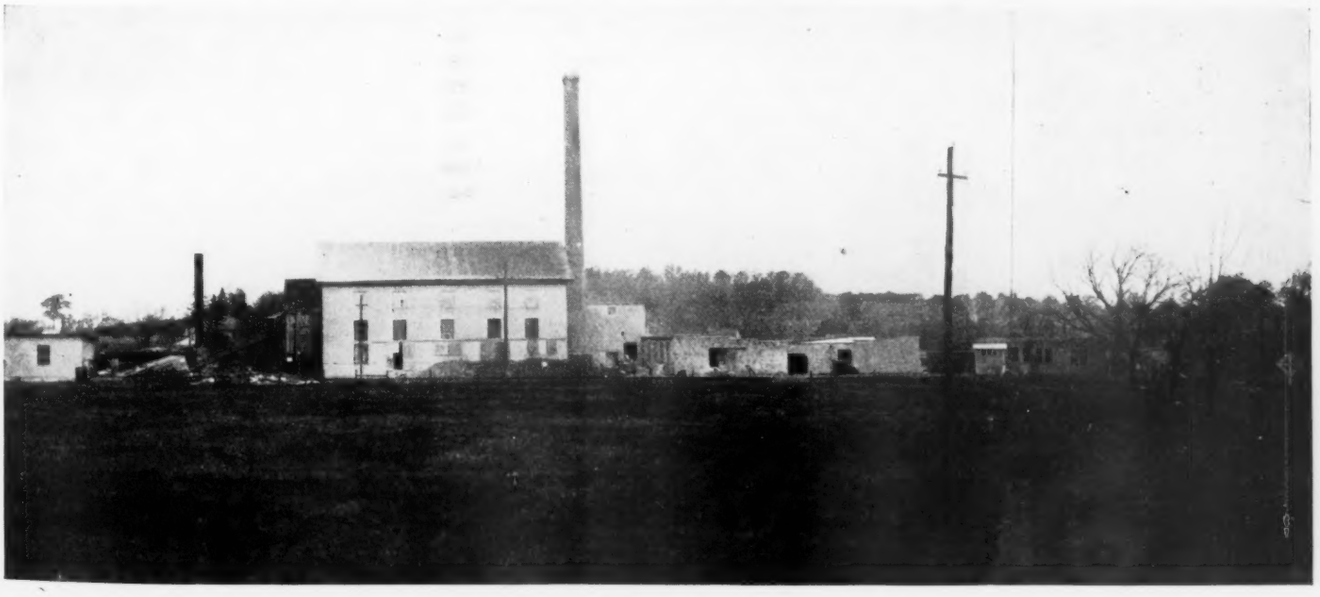
Block Mill Has New Machine That Does the Work of Fifty Hand Molders

THE plant of the Ebsary Gypsum Co. at Wheatland, N. Y., has been called one of the best plants of those completed in 1923. "Completed" is used in the sense that the plant is very much a going and producing institution, but this might have been said of it at any time during the past year, for it was built in a most unusual manner. The Ebsary company first acquired a small plaster plant, which is always referred to as "the little red mill," in the same way that one might refer to the school house of his boyhood. The little mill had been trying to produce plaster regularly for some time, and had failed, not because it not of the best, but only because the company which operated it did not have sufficient capital to operate on a producing scale that would make it a factor in the market. The Ebsary Gypsum Co. bought the plant and started to make plaster and at the same time started to build the new plant on the same site. Work was transferred from the machinery of the old plant to that of the new so gradually that one could hardly say when the old plant ceased working and the new plant began. The longest shut down, due to the transfer, was of less than a week's duration.

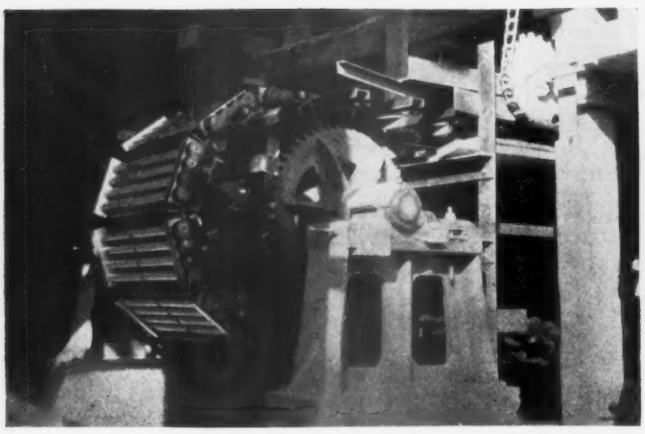


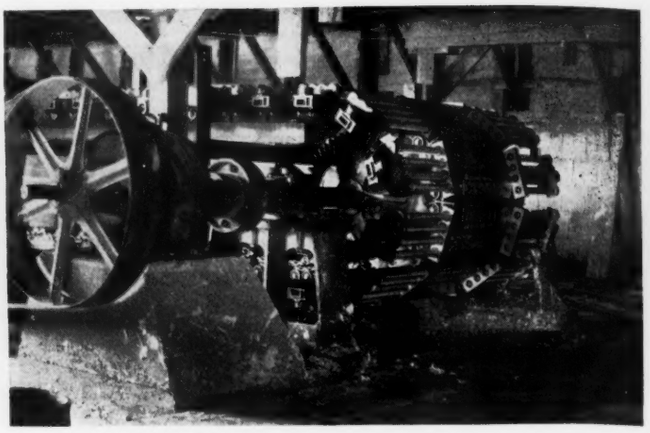
The Ebsary company generates a part of the power it uses in its own hydro-electric plant. The dam is shown here and the concrete power house. The loading side of the plant is in the background

The plaster mill is at Wheatland, which is on the B. R. & P. R. R., about 16 miles from Rochester, N. Y. The Ebsary company also operates a gypsum block plant



Plant of the Ebsary Gypsum Co. at Wheatland, N. Y. The collar of the mine shaft and the incline leading to the mill are in front of the low stack at the left of the picture





Left: Feed end of block machine with the pins in place and the molds ready to pass under the mixer. Right: Discharge end of the machine with pins withdrawn so that the blocks can fall out. A conveyor belt will be installed to receive the blocks

at Garbutt, on the same railroad, about two miles nearer Rochester. Garbutt is well known in the gypsum industry, as it is the home of the Empire and the Lycoming plaster mills. The Ebsary block plant is an old institution, which has operated for some years on stucco bought from the Empire mill. But it is now to all intents and purposes a new plant because of the building of the addition in which is installed the new machine that does the work of 50 hand molders at least.

Land plaster for fertilizing (in a comparatively small quantity) stucco and prepared wall plaster comprise the output of the plaster mill. At the time this article was written no "sanded goods" were being made, but a sand dryer was being built and other preparations were being made to produce them. The company owns a large sand deposit only a short distance from the plant and will produce its own sand for mixing.

The mill is situated at the head of the mine shaft, the two being connected by a short incline which shows at the back of the mill in the picture of the plant. This incline has a slope of 16 deg., which is the slope that is carried underground. The vein is almost flat, only 4 deg. from the horizontal. It averages 50 ft. in depth below ground and an excellent feature is the stability of the limestone roof, which will hold well over a heading 24 ft. wide. The mining system employed is the familiar "room and pillar" system so much employed in coal mines. J. H. Heller, the mine superintendent, obtained his education in coal mines and in gypsum mines, in which he has worked for 35 years.

The Rock Is of Very Even Quality

The even quality of the rock mined is somewhat remarkable. There is no anhydrite (which is an inert form of gypsum that sometimes occurs in such quantities as to be troublesome); in fact, the chemist had to send to a mine in another locality to secure a little anhydrite for experimental purposes.

The rock is brought up by a single rope haulage in 5000-lb. skips and dumped into

The machine makes a block of exact dimensions. Notice the sharpness with which the letters are cast

the crusher bin, which is a small steel lined hopper. From this it flows to the primary crusher, a large Butterworth and Lowe jaw crusher, set with a 6-in. opening. From the crusher the rock falls directly to a Jeffry hammer mill, with manganese steel hammers that stand 10 weeks of service. The product flows to the rock elevator.

Power for the primary crusher is furnished by a Crocker & Wheeler motor. Another Crocker & Wheeler and a General Electric motor drive the hammer mill and the elevator.

The elevator lifts the crushed material to the rock bin, which is of 400-tons capacity. This, and all the other bins in the mill, is of the parabolic type made of steel plate by the Lackawanna Steel Co. A rather unusual method has been installed for spreading the crushed rock in this bin. It is a screw conveyor working without any casing. The rock falls on this from the elevator, and when a pile has been built the screw takes the rock from the top of the pile and distributes it along the bin.

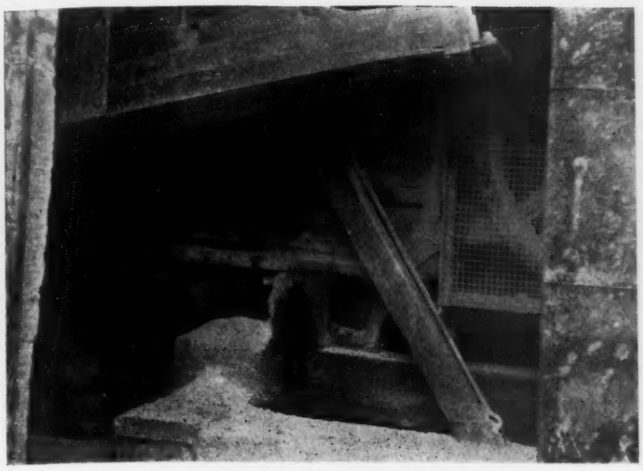
There are five plunger feeders along the bottom of this bin, this type being preferred because it can be closely regulated, and from one or more of these rock is sent to the dryer. There are fins on the inside by which the rock is worked forward, as is necessary because the dryer is set without any slope to carry the rock. One of the illustrations shows a recording thermometer at the end of the dryer, for all through the plant recording thermometers are placed both to check and to record the operations requiring heat. The stack gasses from the dryer leave it at 140 deg. and go to a cyclone for the removal of dust and then to the general dust collector of the mill. The solids from the cyclone fall to the same elevator that takes the remainder of the dryer product to the dried rock bin.

Coke is used for fuel for drying. It has been found that the drying really starts the calcination of the gypsum, about 5 per cent of the 20 per cent of the water of crystallization in the rock going off with the gases from the dryer.

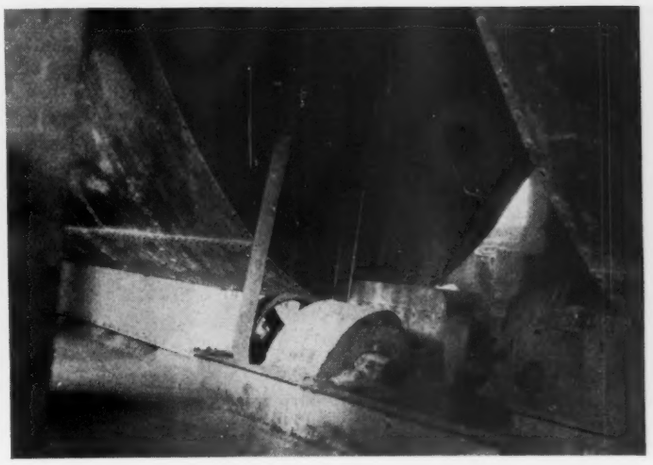
The dried rock bin holds 600 tons. Rachet feeders of the regular Raymond type feed it into three four-roller Raymond mills of the largest size. The mills are driven in an unusual manner. The shaft of the motor goes to a flexible coupling and then to a gear below the mill, so it is really a direct motor drive. These mills are shortly to be fitted with a new feeder attachment by which the feed will be regulated by the pressure on the rolls. The product of these mills is separated out by the usual Raymond air separation system and then sent to four 100-ton bins, one for each calcining kettle. These bins are called the land plaster bins, and some material is drawn from them to be sold as land plaster.

The Kettles

The kettles, each of 10-tons capacity, are filled from the ground rock bins by means of a screw conveyor and inclined chute. These kettles are of the Butterworth & Lowe type and are rated by the manufacturers at 14 tons per charge, but some modifications in the regular design have been made. They contain the usual set of four



The rock falls from the jaw crusher directly into the hammer mill



All bins are of the parabolic, suspended type and made of sheet steel

flues, and revolving arms and scrapers. In the calcination process the recording thermometer plays an important part, although it is not relied upon altogether to tell when a kettle is to be discharged. The experience of the men is such that they can judge from the appearance of the charge when it should be dumped.

It is interesting to watch the recording thermometer during the progress of the calcination. Charging is done with the highest heat and the temperature falls immediately. As the heat is used up in taking away the water of crystallization, the thermometer line keeps practically level. Then it begins to rise, and when it shows the proper temperature, the charge is dumped to the hot pit. Back of each kettle in the hot pit are three 9-in. screw conveyors and these take the calcined material to a 12-in. conveyor which feeds it to an elevator and this takes it to a system of screw conveyors which fill it into the four stucco bins.

Recording thermometers are used everywhere that they are needed

The Plaster Mixers

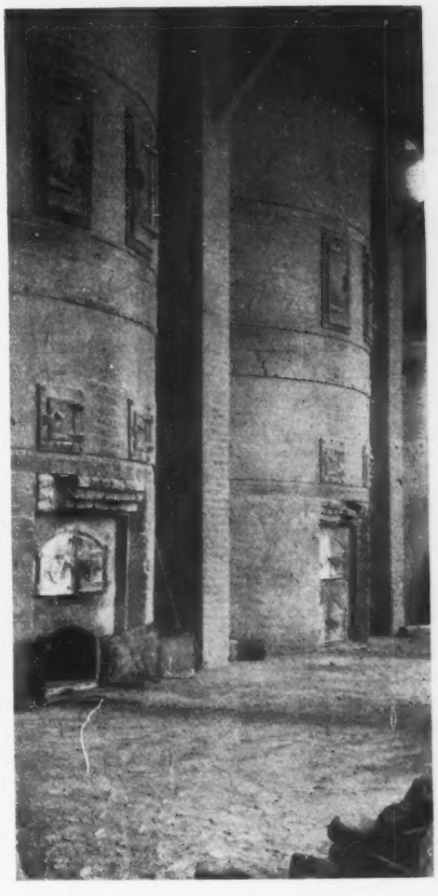
The product is taken by an elevator to bins and from these it is weighed out to the plaster mixers. An attachment balances a steelyard weight by drawing a charge from the bin and then adds hair (or fiber) and retarder (made by the National Retarder Co.) in the quantities desired. Only goat's hair, double picked and washed, is used in plaster making. The charge is dumped on a bell signal from the men who work on the stackers below and falls into a Broughten mixer. From these it goes to the sacking machines, where it is sacked ready for the market.

Power for the plant is taken from three sources. The company uses Niagara Falls power. It has its own steam plant and a private hydro-electric plant. The current from all three sources of power goes to the switchboard shown in the cut, which is somewhat unusual, as it is of the open type. Any machine may be connected with any source of power, but it is impossible to hook up two sources of power to the same machine, thus making the arrangement quite foolproof.

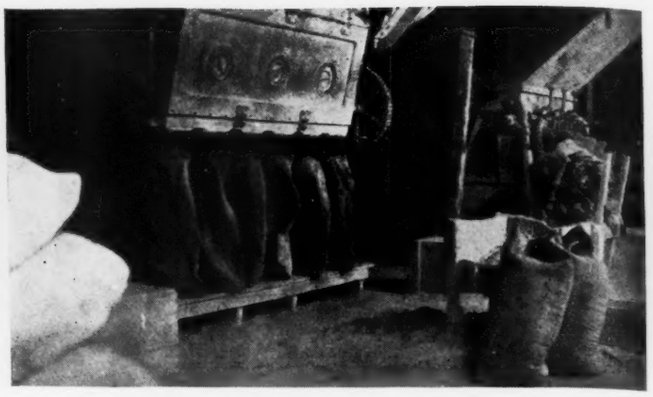
Quality of the Product Controlled by Tests

The quality of the product is rigidly controlled and kept to standard by means of frequent tests. A sample is taken from each kettle as it is dumped and a sample is taken form each five tons of the finished plaster. All these are tested for water carrying capacity, setting quality, and for fineness.

In addition, tests are constantly being made to adapt the plaster to the sand and water in the cities in which it is to be used. A large number of samples of sand are constantly kept on hand and renewed as needed. These are from the sands used in the cities in which the plaster finds a market. Samples of city water are also used in these tests, especially from those cities in which experience has shown that trouble with the water is liable to occur.



The firing floor in front of two of the four calcining kettles



Left: An interesting switchboard. Power from either of three sources may be coupled to any machine, but power from more than one source cannot be thrown on the same machine. Right: Sackers under the finished plaster bin

A Dustless Plant

Perhaps the first thing that the visitor to the plant will notice, especially if he is at all familiar with plaster mills, is the absence of dust in the air. This is due to the excellent dust collecting system. Exhaust fans are placed at those machines which make dust and the draft from these fans is carried to a dust collector high up in the peak of the roof. This is 100 ft. long, and the course traveled by the air current is much longer on account of the system of "over and under" baffles through which it must flow. The settled dust falls into a 9-in. screw conveyor which delivers it to the land plaster bins. This dust not only represents a saving in the health of the men and in the cleanliness of the work, but it is an actual money saving, the dust collected in this way amounting to several tons daily.

Emptying the Dust Collectors Once a Week

About once a week it is necessary to enter the dust collectors and to shake down the dust that has settled on the baffles. But there is relatively little condensation in the collector, considering that all the steam from the kettles is passed through it. This is due to the fact that the hot gasses from the dryer and from the kettles pass through the dust collector and thus keep the temperature too high for condensation.

The main mill building is of brick, as is the big stack shown at one end in the picture. This is the only stack in the plant, except that of the steam power plant. All the gases and smoke, and what little dust may escape from the collector, go out through this one stack, and this arrangement is something of a novelty in plaster mill construction. That only a small amount of dust escapes may be noted from the appearance of the outside walls and the surroundings of the building. It is usual to find the surroundings of a plaster mill white with dust, but these show no dust at all.

Outside Walls of Gypsum Blocks

The office building and garage are built of the company's gypsum blocks, roof, side walls and partitions. The office building is covered with a cement stucco, but the garage has only the uncovered side of the block exposed to the weather. These buildings are a part of an interesting experiment the company is making in using gypsum blocks for outside construction.

The Block Plant Makes Partition Blocks

The block plant of the Ebsary Gypsum Co. at Garbutt, N. Y., makes principally partition blocks. These are molded in all the standard sizes but by far the greater part of the business is in the 3-in. partition blocks.

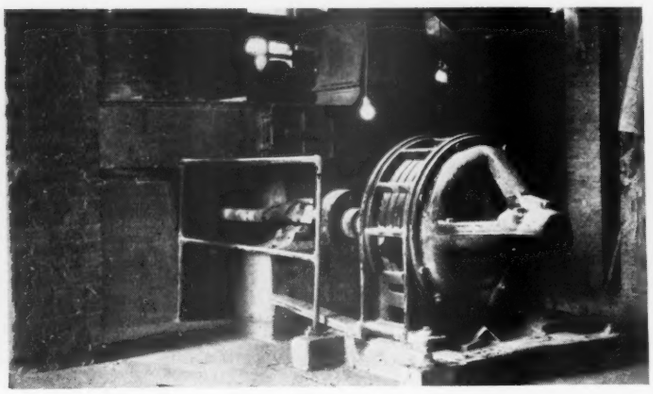
Up to the date of the present writing, all blocks have been hand molded in steel molds with wooden core pins by a very simple process. This method will still be continued for certain sizes of blocks, but the 3-in. and 4-in. blocks, which constitute the bulk of the business, are to be molded by machine.

The Second Machine of This Kind to be Built

This is only the second machine of the kind to be built, and it is said that a description and pictures of the machine have never before been shown in print. It is a simple device in principle, and yet it has only been made to work by the expenditure of a great amount of time and money in experimenting with and making changes in the trial machine.

The machine consists of an endless chain of aluminum molds which are carried on a series of channel irons. It is about 150 ft. in length from the feed end to the discharge end. These molds pass under a mixer which fills them with the proper amount of the composition of which the blocks are made and then pass under a smoothing roll which smoothes the upper surface and forces the composition into the mold. Although the machine travels slowly, it has to be so long in order to give time for the gypsum to receive its initial set.

Each mold contains four core pins, also made of aluminum, which are to make the



Left: The Raymond mills are driven directly from the motor shaft through a flexible coupling. Right: A silent chain drive of a type used in this mill

Both the garage (left) and office building (right) are built of the company's gypsum blocks. The office building is covered with cement stucco but the blocks in the garage are exposed to the weather, an interesting experiment in using gypsum blocks for outside walls

Frederick G. Ebsary, president of Ebsary Gypsum Co.

four longitudinal holes which are a characteristic of this type of block. The interesting feature of the machine is the way these pins are withdrawn from the mold and put in place again. Each pin is cut through in the center so that the halves can be drawn out at the sides. When the filled mold has traveled to the discharge end it meets with two angle irons which are set at a slight angle with the travel of the machine. These angle irons engaged rollers which are connected to the yoke that holds the four pins. The rollers move outwardly from the wedging action of these angle irons and draw the pins with them. A similar set of angle irons push the pins back on the return side of the chain.

In order to insure that the pins are firmly held in place when the mold is filled, a third set of these wedging angles is mounted on the feed end of the machine. The end of one of these angles may be seen in the picture of the feed end just above the shaft.

A Light Oil Spray Keeps the Gypsum From Adhering

To prevent the gypsum from sticking to the molds, a spray is placed on the return side of the chain. This sprays the molds with a light oil to which a small quantity of a heavy oil has been added. The light oil evaporates, leaving a very thin film of the heavier oil on the face of the mold.

The discharged blocks fall on a belt conveyor, which had not been installed when the picture was taken. The full capacity of the machine had not been determined, but it is known that it will do the work of more than 50 hand molders. But speed is not the only advantage of machine molding. Quite as important a matter is the uniformity of the blocks in size and composition. Measurements made on one of the blocks have shown that it did not differ from the required dimensions by a 16th of an inch. And the blocks are never "splay footed," so the mason can lay more of them in a day than he can of the ordinary hand molded block.

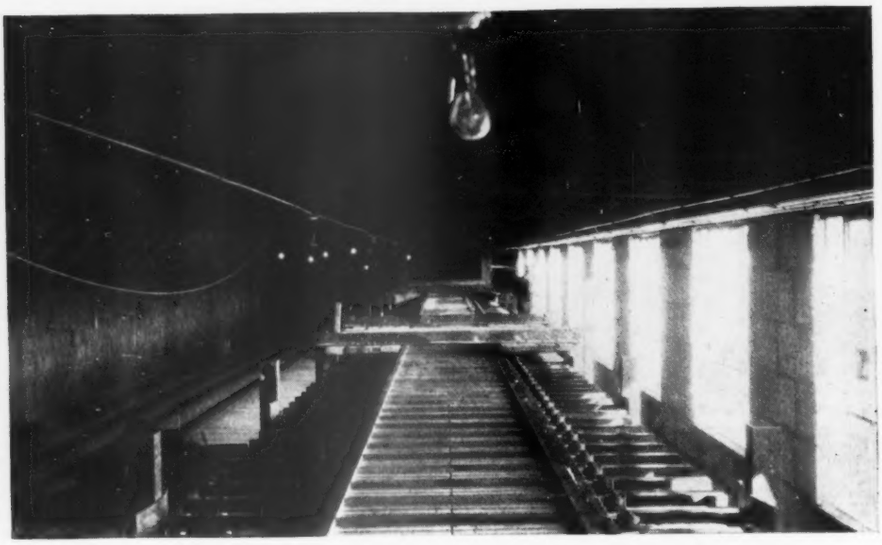
Cured the Same as Hand Moulded Blocks

After molding the blocks are run into the kiln and dried just the same as with the hand molded blocks.

Besides the tiles and partition blocks that are made as described here the Ebsary Co. is a large manufacturer of gypsum roofing slabs. These are made to cover a considerable span and are reinforced with channel irons to enable them to withstand snow and wind pressures. Some very large roofs have been built of these slabs, notably some large warehouse roofs in Canadian cities.

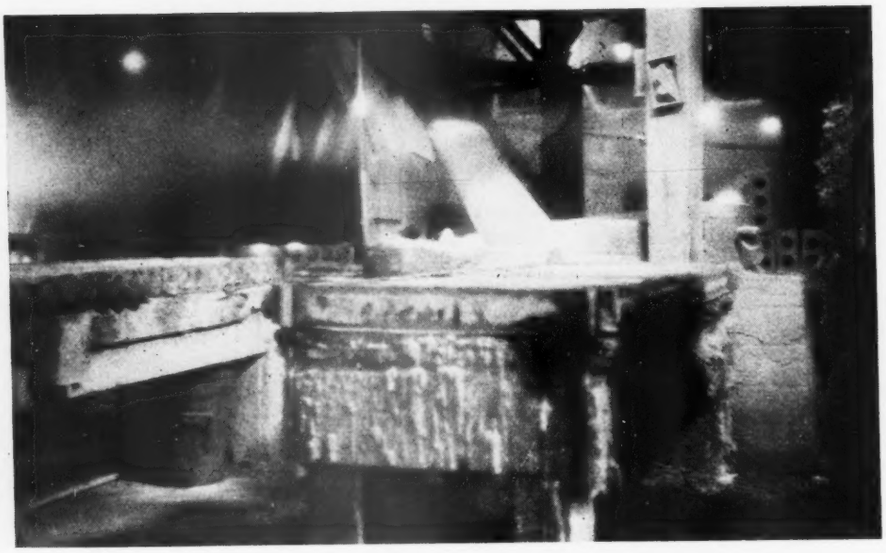
A visit to this plant impresses one profoundly not only with the growing importance of gypsum products in the building industry but with the rapid developments of the manufacture of these products. The old dusty plaster mill in which it was a torture to work has been superceded largely by the mill with dust collection systems that not only render the air breathable but save more than their cost by recovering the not inconsiderable percentage of the product that was formerly spread over the landscape by the winds. Enclosed conveying and handling

George M. Lenci, vice-president of Ebsary Gypsum Co.



Top of block machine which is 110 ft. long. The blocks move slowly to allow the gypsum time to set

View of the Ebsary block plant at Garbutt, N. Y.



A picture of the hand-molding room where blocks are made by the old process. The new block machine will do the work of 50 hand molders

systems have not only supplanted muscle but added their quota of saving by making the plant dustless. Heat control and recording thermometers have substituted exact knowledge of what is going on in the dryer and calciming kettle for the estimate of the workman in charge. And finally the work of the chemist, not only in assuring that the product is kept up to standard, but that the sand and water with which it is to be mixed are of the proper quality, make certain that the plaster on the wall or the tile that goes into the partition will be properly applied so that they will be permanent and durable.

The officers of the Ebsary Gypsum Co. are Frederick G. Ebsary, president; George M. Lenci, vice-president; Donald M. Lewis, treasurer, and Clarence E. Hough, secretary.

Screening Crushed Stone

IN screening limestone for roads it is important that the product should be as accurate as possible in size. In this connection it is well to remember that any shape may be passed as conforming to specification if it will pass through a ring of the stipulated diameter.

It is most important when screening limestone, not to subject the stone to too much "hammering" in the screens, as this tends to round off the angles. If rotary screens or lifters are used they should be of such a pattern as to avoid excessive movement of the stone.

It is also important that the stone should pass through the perforations or mesh as soon as possible; otherwise the various grades will not be properly separated and the stones will not be "clean."

The most satisfactory type of screen for roadstone, so far as the product is concerned, is made of stout wires or rods woven to form a square mesh of suitable size. Such a screen has a much larger area than one made of perforated metal and it also produces a "cleaner" product as the pieces are separated more completely as they travel over the crossd wires, than when they slide along a perforated sheet.

The "cleanliness" of a roadstone, *i.e.*, its freedom from pieces of a larger or smaller size than specified, is very important. It can only be secured by working the screens under good conditions; if they are "forced" unduly, one of the products will be unsatisfactory.

Screens which do not cause an almost instantaneous separation of the smaller particles seldom yield a clean product. Woven screens are superior in regard to sharpness of grading and, therefore, to cleanness of product than are screens made of perforated sheet.

[The above from an English paper, the *Stone Trades Journal*, is equally applicable to American conditions, although all quarry men might not agree with the conclusions of the author regarding the best type of screen to be used.—Ed.]

Cement Manufacture in the South

THE *Dixie Manufacturer* of Birmingham, Ala., says that there was not only a marked increase in the production and use of portland cement in the South last year, but also an unusual enlargement of production capacity. Three new plants were completed and placed in operation, while a fourth was nearly ready by the end of the year.

The Phoenix Portland Cement Co. began the production of cement at its plant located in North Birmingham during May. This has an annual capacity of 1,500,000 bbl.

In September the Lehigh Portland Cement Co., located at Tarrant City, near Birmingham, was in full operation. This, likewise, has a capacity of 1,500,000 bbl. yearly.

Then in December the Signal Mountain Portland Cement Co., at Chattanooga, began running regularly. The initial capacity of this plant is 750,000 bbl. annually, but is designed and equipped for an ultimate production of 1,500,000.

Thus during the year the annual capacity of the Southern cement industry was increased by approximately 3,750,000 bbl. from new plants alone.

The plant of the Hermitage Portland Cement Co. at Nashville, which is nearing completion, will have an initial capacity of about 600,000 bbl. per year, increasing the new capacity even further.

The older plants also were very active in making improvements. Those made and planned by the Dixie Portland will increase the daily production of its plant from 4500 to 6000 bbl.

About 18 months ago this company started out on a construction program that contemplated the modernization of the entire plant. On the program were listed a new concrete slurry storage, new shop building, new office building and laboratory, new boiler plant, new crushing plant, entirely new raw grinding machinery, additional power unit and additional equipment in clinker mill.

At the present time completed work includes office building, shop building, boiler plant, crushing plant, while work on the raw grinding mill is well under way.

Improvements, though not as extensive as those effected by the Dixie Portland, have been made by the other plants.

The Gulf States Portland Cement Co., though, is planning to enlarge its plant some time soon, so officials state.

The South now has 11 active plants and the Hermitage plant will increase the number to 12.

Five are located in Alabama, four in Tennessee, two in Georgia and one in Virginia.

These are as follows:

Alabama—National Cement Co., Ragland; Lehigh Portland Cement Co. and Phoenix Portland Cement Co., Birmingham; Golf States Portland Cement Co., Demopolis; Atlas Portland Cement Co., Leeds.

Tennessee—Dixie Portland Cement Co. and Signal Mountain Portland Cement Co., Chattanooga; Clinchfield Portland Cement Co., Kingsport; Hermitage Portland Cement Co., Nashville.

Georgia—Southern States Portland Cement Co., Rockmart; Georgia Cement and Stone Co., Portland.

Virginia—Lehigh Portland Cement Co., Fordwick.

According to a preliminary report of the Geological Survey the South produced 7,879,000 bbl. in 1923 as compared with 5,940,000 bbl. in 1922, and 5,051,000 bbl. in 1921.

Monthly production figures for the past three years have been given as follows:

	1923	1922	1921
January	530,000	305,000	280,000
February	456,000	359,000	320,000
March	546,000	488,000	456,000
April	573,000	566,000	460,000
May	643,000	509,000	336,000
June	647,000	544,000	485,000
July	626,000	550,000	478,000
August	681,000	533,000	392,000
September	779,000	468,000	524,000
October	838,000	590,000	545,000
November	831,000	567,000	495,000
December	708,000	460,000	280,000
For year	7,879,000	5,940,000	5,051,000

From plants and production figures it is entirely appropriate and timely to turn to the men who are directing the distribution—the sales managers.

Below we present the men who stand back of the cement that is making the South more permanent:

J. H. Dalbey

John Dalbey's service record with the Dixie Portland, Chattanooga, is nearly as old as the company's. He joined the Dixie Portland in 1908 as traffic manager, having had previous experience in the railroad business. Then, later, the duties of assistant sales manager were added to those of traffic manager, following which came the sales managership.

B. Cowden

B. Cowden, of the Southern States Portland, Rockmart, Ga., has served as a sales manager about as long, if not longer, than any other in the South. He, also, was a former railroad man.

W. Jess Brown

W. Jess Brown has directed the sales of the National Cement Co. and the Georgia Cement and Stone Co. since January, 1921.

His cement experience dates back to 1907 when he started as chemist for the United Kansas Portland Cement Co., Independence, Kans. From 1908 to 1911 he was chief chemist and assistant superintendent for the Dixie Portland Cement Co.; 1911-1912 chief chemist, Edison Portland Cement Co., Stewartsville, N. J.; 1913-1917, sales department Dixie Portland; 1918-1919, Ordnance Dept., Army; 1919-1920, sales department Dixie Portland, after which he joined the National Cement Co.

Frank G. Conkling

Assisting with the sales of the National Cement Co. is Frank G. Conkling, who became associated with the National Cement Co. on September 1, 1923, in the capacity of assistant to the president. For 12 years prior he was with the Atlas Portland Cement Co. at Boston and Birmingham, coming South to Birmingham in 1920 as Southeastern sales manager when Atlas bought the Standard Portland Cement Co.'s plant at Leeds, Ala.

S. C. McCurdy

S. C. McCurdy, of the Phoenix Portland, Birmingham, is new to the South, but not to the cement trade of other sections of the country. In both the North and the Southwest he has previously been active in sales work.

G. F. Davenport

G. F. Davenport, of the Gulf States Portland, Demopolis, Ala., is the youngest sales manager in the South. His cement training, however, has extended over a period of 10 years and has been under some able executives. He has handled the sales of the Gulf States plant for the past two years.

Frank M. Traynor

When the Lehigh Portland opened its Southern sales office at Birmingham in May, Frank M. Traynor was sent down as manager. Mr. Traynor has been with the Lehigh company for nine years. For two years he was office manager at Allentown, Pa., then in 1916 was sent to Richmond to handle sales for the newly purchased plant at Fordwick, Va. He continued as sales manager at Richmond until transferred to Birmingham.

Morris Hunter

Morris Hunter, of the Clinchfield Portland, Kingsport, Tenn., has been sales manager for about five years and prior to that was assistant sales manager with offices in Cincinnati. Still earlier he was with the Edison Portland Cement Co.

J. I. McCants

J. I. McCants, as sales manager of the Signal Mountain Portland Cement Co., at Chattanooga, is giving to a new plant ample sales experience and a wide acquaintance in Southern building circles. For about 12 years prior to 1920 he was sales manager of the old Standard Portland Cement Co. In 1920 the Standard plant was absorbed by the Atlas Portland Cement Co. Later, Mr. McCants was one of the organizers of the Standard Fuel and Material Co., Birmingham, and on leaving this company was connected for a time with the National Cement Co.

D. R. Long

Another newcomer in Southern sales circles is D. R. Long, who in August was sent to Birmingham by the Atlas Portland to become Southern sales manager. Before coming to Birmingham, Mr. Long was an assistant Eastern sales manager.

Edward Govern

Edward McGovern, of the new Hermitage Portland, Nashville, whose plant is now nearing completion, was previously with the Dixie Portland.

Peerless Cement Co.'s Detroit Plant

[The following description of the progress made on the new plant of the Peerless Cement Co. at Detroit, Mich., is from the Detroit *News*.]

DETROIT capital has begun the construction in this city of the most modern cement manufacturing plant in the world. The group of men back of the project have bought a tract of 14 acres hemmed by the River Rouge, West Jefferson avenue and the Michigan Central switch track on the west side. Here the plant will be built—4½ miles from the city hall.

Work already has begun on docks 9000 ft. long to be built of reinforced concrete. The manufacture of cement will be by the wet process. Self-unloading ships will bring rock from Calcite, on Lake Huron, 10,000 tons to a ship, and unload the rock at the mill on the Rouge.

The clay will be brought from nine miles down the river.

The plant will have a capacity of 4500 bbl. a day, or 1,500,000 bbl. a year. It is estimated Detroit is using now about 3,000,000 bbl. of cement yearly.

Engineers have declared the cost of the plant will be $3,500,000. In four "compeb" mills, 28 ft. long and 7 ft. in diameter, stone and clay will be ground together by revolving cylinders in which will be 160 tons of steel balls. In one compartment the balls are 4 in. in diameter, in another 2 in. and another ⅞ of an inch.

This mixture—slurry—of which 31% will be water, will be pumped to rotary kilns—three in number, 175 ft. long, 11 ft. in diamter, where it will be burned.

The cement clinker will be conveyed to five clinker grinding mills each 28 ft. long and 7 ft. in diameter. In these, the clinker will be ground and mixed with 3% of gypsum.

Thence it will be conveyed to eight storage silos, each 85 ft. high and 33 ft. in diameter.

All power for the operation of the plant will be developed from the waste heat coming from the flues of the kilns. Modern machinery for dust collection and disposal and the conveying machinery will go towards making the plant the most modern known.

The company already operates a plant at Union City, Mich. It will operate both plants, of which the Detroit mill will be the most important.

The president of the Peerless company is Col. William M. Hatch; vice-president, Charles S. Bush; directors, Garrett W. Patterson and Robert D. Baker; consulting engineer, A. F. Miller.

Clinchfield Portland Cement Corp. Begins to Construct Plant

THE Clinchfield Portland Cement Corp. of Kingsport, Tenn., advises the editor that it has begun construction of its new plant at Macon, Ga. The initial unit, which is under construction at present, will consist of two kilns 175 ft. long and 10 ft. internal diameter. These will have waste heat boilers attached, according to modern practice.

In one or two cases the exact types of machines which will be used in the grinding plant have not been decided upon, so full details of the construction cannot be given at this time. But electric drives will be used throughout, 2300 volt current being generated.

The company plans to have the plant in operation at the end of 10 months and with this end in view they are employing as many laborers as can be economically worked. At the present time they have from 250 to 300 men on the job.

Wabash Cement Co. to Build Plant Near Dayton, Ohio

ENGINEERS of the Wabash Cement Co., with headquarters in Detroit, are surveying the ground in the vicinity of Reed's Hill, northeast of New Osborn, Ohio, in preparation for the erection of a cement plant on the site, according to local reports.

Through its agent here, George H. Snyder, realtor, Dayton Savings and Trust building, the company has acquired 845 acres of land in that vicinity. Drillers have taken samples of the rock to the company laboratories. Tests found it to be suitable for the manufacture of cement.

It is said the company will spend in the neighborhood of $1,000,000 in building a plant and installing machinery. Several hundred men will be given employment. Actual construction is expected to get under way during the next two months.

The company also operates a plant at Stroh, Ind. The general offices are at Detroit, Mich. Emil Stroh is president; L. E. Palmer is in general charge of operation.

Another cement concern is alleged to be planning the erection of a plant in the same vicinity, but the name of the firm was not divulged.

Why the Portland Cement Was Rejected

EDITOR, ROCK PRODUCTS: In the issue of your journal dated February 23, 1924, on page 53 appears an article headed "Highway Contractor Should Advise Cement Company Within Reasonable Time if Cement Is Below Standard" and in this article the Alpha Portland Cement Co. is referred to as the defendant in a case brought by the State of Michigan. This case arose out of an attempt by the Burt Portland Cement Co., to collect for cement shipped in 1918. When the Alpha Portland Cement Co. purchased the property of the Burt Portland Cement Co. it succeeded to the interest of the Burt Portland Cement Co. in this case. The cement in question was not manufactured by the Alpha Portland Cement Co. nor sold by them. Further, the evidence in the case indicated that the cement in question had been held for a very long period of time in storage, which was not of the best, and difficulty with the product when they attempted to use it doubtless arose from that fact.

ALPHA PORTLAND CEMENT CO.

Cement Official Says Concrete Houses May be Built for $5,000

J. W. JOHNSON, assistant general manager of the Portland Cement Association, speaking of housing prospects, said that in his belief the great need in the housing field for 1924 is to interest architects in the designing of comfortable, livable houses which can be built or bought for about $5,000.

"It is my observation," he said, "that many houses now costing considerably more could be duplicated for $5,000, if the greatest care was taken in planning and ordering materials, and in many other ways.

"Concrete masonry constructoin can usually be had at approximately the same cost as frame construction and quickly proves its economy by the elimination of paint bills, less depreiation, smaller coal bills and greater physical comfort."

Versatility of the Cableway Dragline

Rochester, N. Y., Plant Uses It First to Work an Underwater Sand Deposit and Then a High and Dry Gravel Bank

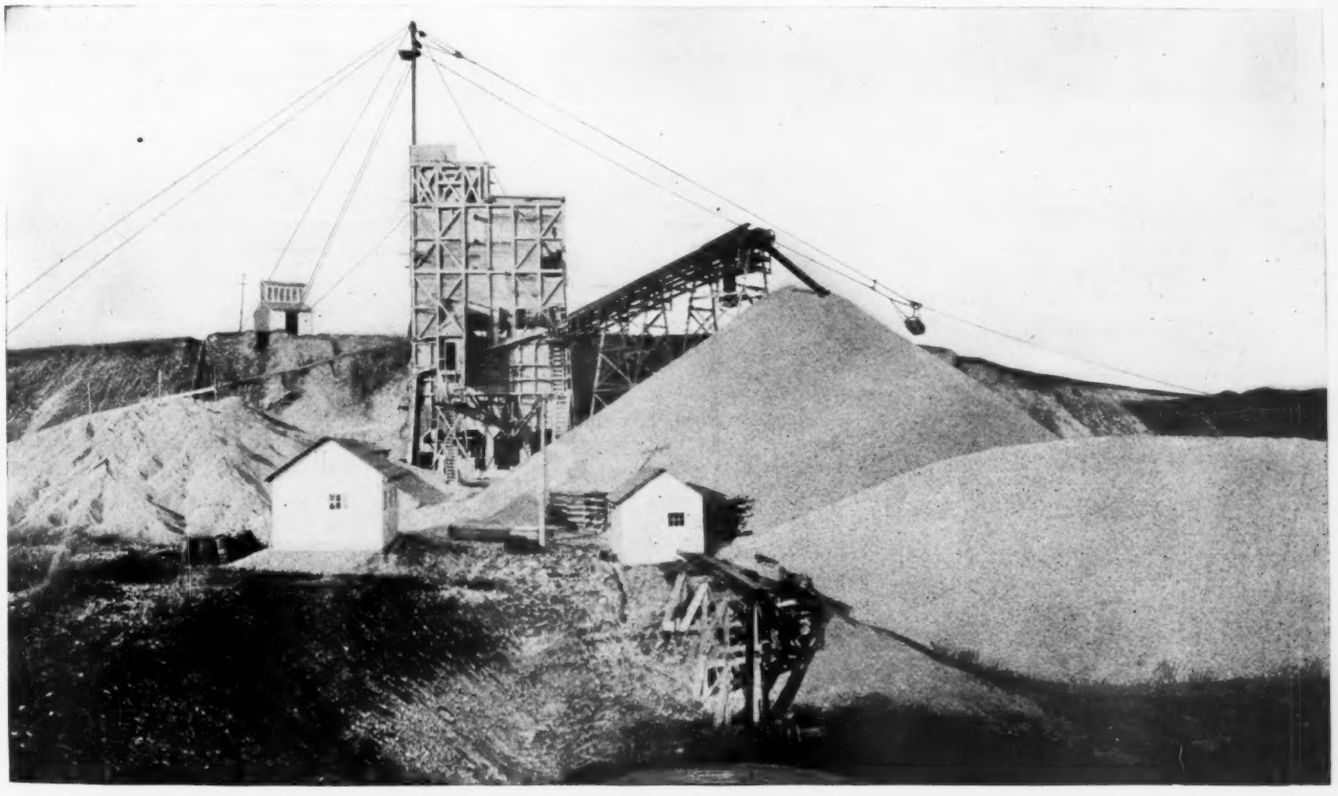
By H. A. Stelley
Superintendent, Valley Sand and Gravel Corp., Avon, N. Y.

THE site of the Valley Sand and Gravel Corp. plant at Canawaugus, N. Y., is a gravel plateau which was originally about 100 acres in area, but 20 acres of this was partially worked out some years ago by the Pennsylvania and Erie railroads. There is 55 ft. depth of digging in the dry and 15 ft. of fine material under water before hard-pan is reached. In the earlier operations, excavating had been carried down only to the railroad grade, working a bank about 45 ft. high, hence a 25 ft. depth of material remained in the worked-over area when the railroads abandoned the proposition. This represented some 2,000,000 cu. yd. of excellent material, already stripped, and the incorporators of the Valley Sand and Gravel Corp. decided to take this out before starting into the untouched bank deposit of 80 acres.

By locating the plant on the floor of the old pit, close to the bank, it was evident that it would be possible with a slackline cableway excavator of ordinary span to reach all the material in the old pit and later swing the line of operation around into the bank where several millions more yards would come within the cableway's working radius.

So a plant was designed that would rise 50 ft. above the top of the bank and the work of building the plant and putting in a siding from the Pennsylvania railroad was started in the spring of 1920. Once decided upon, plans were carried out with speed. For example, the electrically operated 2 yd. Sauerman slackline cableway excavator, which was purchased as the excavating and conveying unit, was erected as soon as the frame of the bin structure was up and while the workmen were completing the plant, the cableway was digging a pond to supply water for the washery.

During the two years following completion of the plant, things worked out almost according to schedule. Sand, which predominated in the floor of the pit, was in great demand, while orders for gravel were relatively light. But, as the material became better known to the market, establishing its reputation as a clean, washed material, the demand for the company's gravel increased and it became evident in the fall of 1922 that it would be advisable to shift operations to the bank where the formation ran more heavily to coarse material. This was quite contrary to the original plans, as only one-fourth of the old pit had been taken out down to hard-pan, but owing to the change in the market demand, there was no alternative except to place the equipment where it could produce more gravel and less sand. So an area on top of the bank was stripped late in 1922 and the cableway swung around to its new field of operation in the spring of 1923. The 5-acre excavation on the lower level then became a disposal basin for the plant's waste wash water and will furnish ample room



Plant of the Valley Sand and Gravel Corporation at Canawaugus, N. Y.

for this purpose for some years to come, solving a troublesome problem.

True to the tests that had been made, the material on top of the bank averaged last season approximately 60% gravel, a small percentage being as large as 10 in. in diameter, crushing equipment for which had been installed when the plant was built.

General Description of Plant

A brief description of the plant may be of interest to other sand and gravel producers. The Sauerman cableway delivers directly to a hopper on top of the plant, the mast resting on top of the hopper, which is so built that the mast may be moved all around this hopper, allowing the cableway to be operated in any direction.

The operator of the cableway is in a cabin directly over the hoist. This cabin is glass enclosed on three sides allowing a good view of the pit and the plant. The hoist, below, is seen through an opening in the floor of the cabin. This opening is composed of a flat piece of old screen of about 1-in. perforation.

The material in the hopper passes through a gate at the bottom of the hopper and runs over a grizzly which takes out all the material over two inches. This oversize goes to a No. 2½ Climax jaw crusher. The crushed material falls into the chute below, which also carries the sand and gravel that comes through the grizzly. The material goes to an O'Laughlin jacketed screen where it is washed and separated into one size of sand and three commercial sizes of gravel, the oversize going through a chute to a small hopper, below, outside of the plant, where it is recrushed by a 36-in. Symons disc crusher and then elevated to the top of the plant by a bucket elevator and delivered to the washing screen. The largest commercial size may also be passed through this Symons disc crusher for recrushing by opening a gate at the bottom of the side of the bin, which allows the material to flow into the small hopper over the crusher.

The sand and water after leaving the screen pass through a chute and into a Good Roads Machinery Co. washing box, where the water is discharged into the waste chute at one end, while the sand is dragged up an incline and dewatered at the other end by use of a flight conveyor which is part of the washing box equipment.

The entire plant is operated by electric current from Niagara Falls. It is delivered to the plant at 11,000 volts where it is stepped down by three 100-kva. single phase General Electric transformers to 220 volts. Taps are provided in the transformers for 440 volts also. Lightning arrestors are installed to protect the transformers.

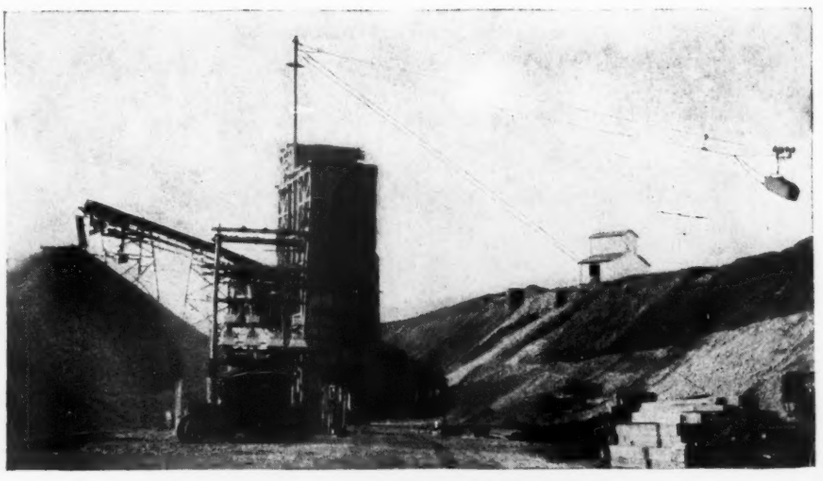
Working the new deposit for gravel of larger size.

Provision for Storage

When the plant was designed no provision was made for storage of excess material in summer or for building up a reserve supply in the winter. An effective arrangement has been devised, however, that utilizes waste space near the plant and permits of storing either sand or gravel or both at the same time.

In this arrangement a field conveyor is utilized which had been previously employed with a locomotive crane to supplement the efforts of the cableway during a part of one season when there was a sudden and unexpected demand for large quantities of sand. This conveyor, rebuilt, was installed on towers and used for storing gravel. Two grades running from one-quarter inch to one and a half inch were stocked in one pile, all gravel above one and a half inch being crushed to this size. Two hundred cars of gravel may be stored here without using additional equipment. Sand is stored on another pile by means of a chute that runs from the top of the sand bin. The capacity of the sand storage is about one hundred and fifty cars.

The Little Giant locomotive crane, above mentioned, is being used to reclaim the stored material, moving from one pile to the other as required. This method, while sufficient for small and steady demand, has not been entirely satisfactory during periods of greatest demands when the material within reach of the crane, set to load into cars, has been exhausted and the balance of the material had to be rehandled. Another method of reclaiming is now being considered, which will not only reclaim practically the entire storage pile at one setting, but will also be used to increase the storage capacity.



Plant was placed in the old pit—Ground storage

Bill to Buy Fertilizer Defeated in Senate

IN the first record vote of the session on a farm relief measure the Senate defeated, 34 to 28, the proposed appropriation of $5,000,000 to be used in financing fertilizer purchases.

The appropriation was proposed as an amendment, offered by Secretary Harris, Democrat, Georgia, to the Norbeck-Burtness bill, which would appropriate $75,000,000 to finance diversification of crops among one-crop farmers.

Opposition to the fertilizer item was voiced from both sides of the chamber on the ground it was unconstitutional.

Research Gives Value to Hitherto Little Known Rock Product

A Great Industry Built Up by Untiring Efforts in Developing Markets for a Now Indispensable Product — "Celite"

THE development of a world market for material which was only a curiosity 25 years ago, is an achievement of which an organization may be justly proud. Twenty years of untiring effort, founded on the sincere belief and knowledge of the actual value of the product, has made it possible for the Celite Products Co. to create a demand for diatomaceous earth in various forms, which is now expressed by one of the greatest and most fundamental of industries.

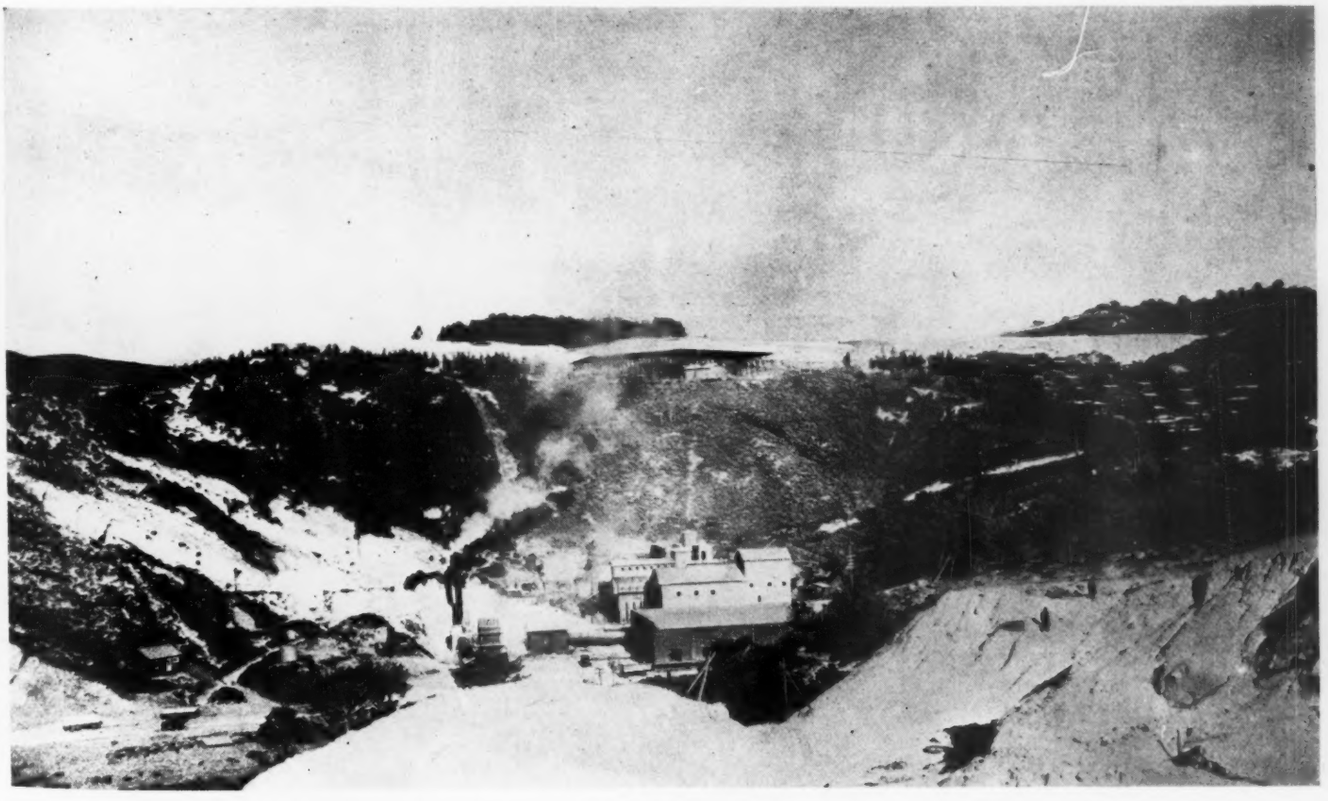
Diatomaceous earth distributed by the Celite Products Co. is a white silicious mineral weighing only 30 lbs, per cu. ft. in the natural compact form, and but 8 to 10 lbs. per cu. ft. when disseminated to a fine powder. Although composed almost entirely of silica, it is not crystalline like quartz, but has an amorphus structure. The fossilized remains of diatoms constituting the material from this deposit are microscopically small silica shells of plants which lived in marine waters during the Miocene era and belonged to the class of Plankton marine diatoms of which only a few deposits have been found.

Diatoms have a multiplicity of forms (over 8,000 varities have been classified) and the delicate tracery of intricate designs has been the delight of microscopists. Admitting that diatoms were works of art, they had never-the-less not been put to economic use until 1902, when three men with vision, a laborer and a mule, started to quarry and sell diatomaceous earth for insulation of dwellings and refrigerators.

H. S. Thatcher, general manager, Celite Products Co., is the man who put "Celite" in the dictionary.

Installation of Laboratory Brought Business

In 1904 a company was organized with a capital of one million dollars and the output consisted of a carload a week. New men and interests and increased business made it possible to create a laboratory in 1913—and during 1916-17 the industry had already attained national importance. At the present time, the producing company has an able engineering staff which designs nearly all the machinery used in pulverizing, drying, separating and classifying the materials. A research staff and laboratory is maintained; the expenditure for technical development work for the past year exceeded $50,000. This research organization and equipment is being concentrated on developing most effective uses for the materials, standardizing the methods of application, determining the most economical



Plant of the Celite Products Co., Lompoc, California—Mountains of diatomaceous earth as white as snow

General view of one of the deposits of diatomaceous earth now being mined

forms of insulation for different types of equipment and other investigations which will allow the user of "Celite" products to derive from them their maximum effectiveness.

Mountains of Raw Material

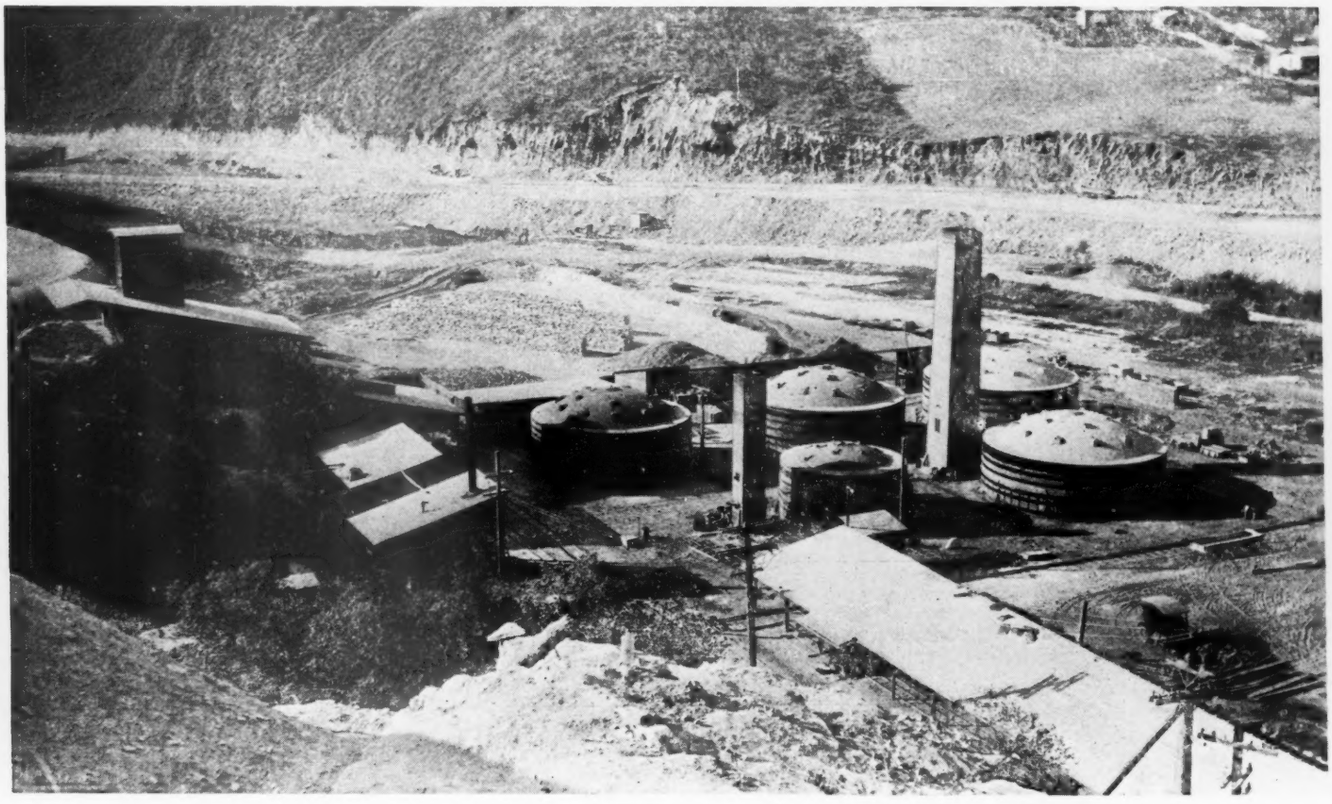
The deposit, judged by authorities to be the largest of its kind in the world, is located entirely within the four square miles which comprise the company property south of Lompoc, Calif., The diatomaceous earth is uncovered by quarry methods and exceeding care is taken in the selection of proper strata in order to produce material which will have the required properties for certain uses. Since the crude rock contains as much as 50% moisture, it has to be dried, and although ricks of crude rock are still left to dry in the quarries by natural evaporation, some material is dried artificially. The mills do not grind the rock; disintegrators, designed by men who have been studying this problem for many years, break up the lumps in such manner as not to injure the delicate structure of the individual diatoms. The total connected power at the mills and quarries is in excess of 1500 hp.

Minute Size of Particles Presents Air Separation Problem

The disintegrated rock is then separated into various grades by means of cyclone air-separating systems and air filters. Some idea of the difficulties encountered may be obtained by recalling the exceedingly light weight of the material, which practically scoffs at gravitational separation and the fact that some grades produced are on the order of 5000-mesh, having particles of 0.000039 in. in size.

An operating force of from 500 to 600 men, or more, is constantly employed at the plant. Employes are housed in comfortable homes, many of them made from the natural "Celite" blocks, and the camp contains stores, a theater, club-rooms and other facilities.

A standard-gage railroad has been built recently, from Lompoc to the plant, a distance of five miles, so as to enable the products to be loaded on cars directly at the plant. It has been necessary heretofore to haul the cartons and bags from the mills to Lompoc by a fleet of trucks, each hauling two or three trailers. A portion of the



"Kilns" for making special brick—The product is sold in a number of manufactured forms.

output, especially of "Filter-Cel" destined for the eastern sugar refineries, has been loaded on steamships at Port San Luis.

Now Recognized as Best of All Insulators

"Sil-O-Cel" heat-insulating bricks are unquestionably the highest form of insulating material that has yet been developed. The first material one thinks of in this connection is asbestos, but few people realize that at temperatures of 800°F. or above, asbestos burns out and leaves only a slight ash. "Sil-O-Cel" is indestructible up to 2900° F. and has a lower heat conductivity than any other mineral found in natural form.

Brick for heat insulating purposes, known as "Sil-O-Cel" insulating brick, are cut directly from the quarry floors by machines developed at a time when the navy, government plants and all industries were begging for this type of insulating brick and the plant was almost commandeered by the war department. The resistance of heat flow through one of these brick is almost uncanny: it is possible to heat one end of a 9 in. brick to a white dripping heat and it will still be possible to hold it comfortably at the other end.

Another brick known as "Sil-O-Cel C-22" is made by molding, pressing and burning the brick to high temperatures. The brick produced has semi-refractory properties which make it especially useful for insulation of equipment where temperatures are so high that ordinary insulating materials disintegrate, shrink and lose their structural strength.

Shipping "Celite" at Port San Luis

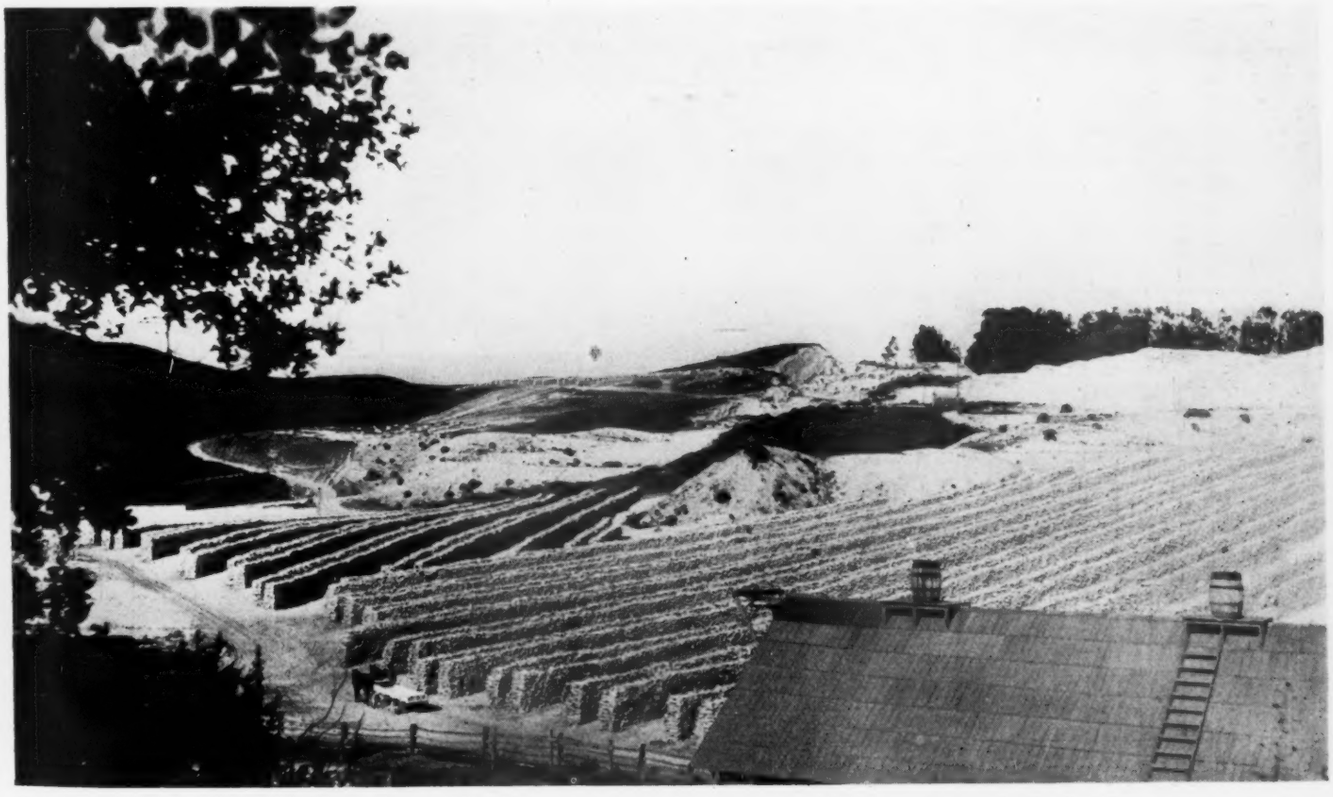
All brick are shipped in cartons of 25 each, so that breakage is negligible. The powdered insulation, or filtration grades, are shipped in large burlap bags of about 90 lbs. each. Special bag filling machines had to be designed, as the 90 lbs. of loose powder occupies from 9 to 12 cu. ft. and this is to be compressed into a bag having only 4 cu. ft. without bursting the bag.

Besides these products, blocks, mortar, plastic insulating cements, and an insulating concrete aggregate are manufactured.

The steel industry uses "Sil-O-Cel" very extensively, practically all hot blast stoves erected in recent years being insulated between the refractory lining and the steel shell with "Sil-O-Cel" powder. Furnaces, annealing ovens, pickling tanks, hot metal cars, and cupolas are insulated. This form of construction tends to give uniformity of temperature, production of a better product and the elimination of over or under done batches of steel or metal.

Cement and Lime Kilns

Lime kilns from which the radiation loss amounts to 20%, or more, of the heat supplied show a heat loss of 7% when insulated. Cement and other rotary kilns are almost universally insulated with "Sil-O-Cel" calcined brick, resulting in an average saving of from 2½ to 5 tons of coal per thousand barrels of cement. There is an increase in the temperature of the stack gases at the same time which enables the waste-heat boilers to produce more power and great total saving in fuel. Breechings and ducts conducting hot gases are also insulated to prevent radiation and to elimi-



Celite drying in the sun—the method originally employed to dry the raw material—the drying is now done in special kilns also.

nate the precipitation of carbon in the gas mains.

Glass lehrs or annealing ovens, which are used in the manufacture of the most delicate glassware, are insulated with "Sil-O-Cel," thereby eliminating cold corners, which set up strains and form cracks in the glass. China, pottery, brick, tile and sewer pipe and kilns having losses by radiation and conduction amounting to as high as 65% of fuel used, are being insulated both in the hub walls and crowns as well as bases. By proper insulation of ceramic kilns, it has been possible to save from 200 to 400 lbs. of coal per thousand brick burned and proper construction usually reduces the fuel bill by 25%.

The rapid growth in the use of electric heat in enameling, baking and drying ovens, is primarily due to efficient insulation, as electric power is too expensive to use indiscriminately in poorly constructed or designed equipment. A review of the literature on this point will disclose the fact that a great deal of care has been taken to ensure proper thermal insulation. This care in construction details should also be applied to all heated apparatus.

Petroleum Industry Developed a Big Outlet

The petroleum industry, acknowledged one of the most progressive and successful, is using "Sil-O-Cel" products on crude, topping, coke and steam stills, dephlegmating towers, absorption towers, sweater buildings, hot oil lines, vapor pipes—and many other forms of equipment. The use of "Sil-O-Cel plastic insulating cement" is especially useful in this industry, as much of the equipment has irregularly shaped metal surfaces to which brick are more easily applied. The Standard Oil, Shell, Associated, Sinclair, Union, Petroleum, Roxana and a host of others are users of "Sil-O-Cel". There has been no more effective or economical method of insulating storage tanks developed, than that construction recommended by "Celite" engineers and great savings are made daily of oil which would otherwise evaporate.

Large power plants such as the Hell Gate station and the power units of large manufacturing centers are usually insulated with "Sil-O-Cel" brick. The steam boiler is probably the most efficient single piece of equipment universally used, yet if the 8 to 10% loss by conduction and radiation can be reduced to 3 to 5%, then the investment in "Sil-O-Cel" is paid for within a few months and earns dividends for years to come.

There are a great many uses to which "Celite" may be put; for instance, as a filler in plaster and wallboard, magnesite composition, absorbent for nitro-glycerin in the manufacture of dynamite; filler in asphalt paving to prevent softening, as a filler in soaps, paints and inks, rubber, beauty clays, cleansers and matches. Recently the Bureau of Standards has made an investigation on the effect of "Celite" when added to concrete and acknowledged its superiority in producing a concrete which will not segregate and is denser and more waterproof and is more workable than concretes obtained otherwise.

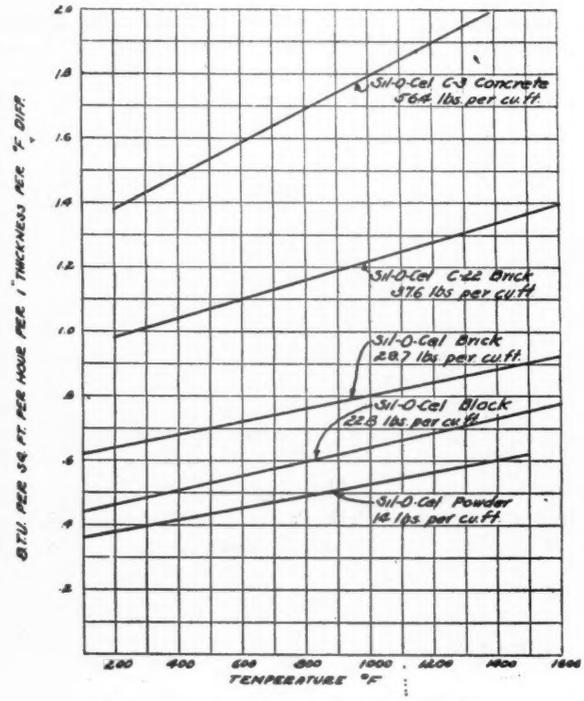
One of the powdered grades of "Celite" sold under the trade-name of "Filter-Cel" is extensively used in facilitating the filtration of liquids, chemicals and oils. Very few people realize that over 90% of the cane sugar refined is filtered through "Filter-Cel" and that "Filter-Cel" enters into the purification of materials which make up the necessities of life. Beverages, fruit syrups and extracts, corn syrups and molasses, jellies, lards, cooking compounds, fish

SPREADING THE RESULTS OF RESEARCH

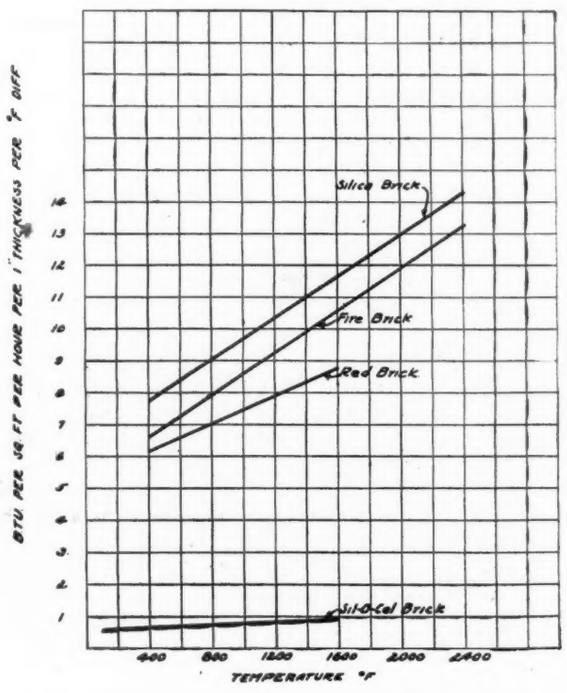
THE Celite Products Co. of Chicago has recently instituted a novel method of distributing engineering data on its heat insulation products. For the convenience of engineers who may use that form of engineering data, they have reproduced many of their blueprints and charts in Lefax size sheets, punched and ready for insertion in standard Lefax loose-leaf binders.

These include charts showing comparative conductivities of "Sil-O-Cel" brick, red brick and refractories, as well as heat losses through various wall constructions, insulated and uninsulated, and drawings showing methods of insulating such equipment as boilers, furnaces; ovens; brick; lime and cement kilns; gas equipment; glass equipment; oil stills, etc.

These "LeFax" size sheets are not intended to replace their regular literature and standard size blueprints, but the number of requests received for this form indicates their popularity for ready reference purposes.



Conductivity of Various Sil-O-Cel Products.



Conductivity of Sil-O-Cel Brick, Red Brick and Refractories.

oils, lubricating oils, cocoanut, cottonseed, olive and castor oils, glycerine, perfumes, varnishes, paints, intermediates and dyes citric and acetic acids, salt, borax and potash solutions, serums, anti-toxins and sewage, are filtered, purified, sterilized, or in some distinctive way made better by treatment with "Filter-Cel."

Developed by Men of Vision

To the men directing this great organization, credit should be given for their indomitable courage in creating such an extensive field for a product which was practically unknown.

H. S. Thatcher, general manager of the Celite Products Co., has been identified with its growth from the very first.

Prior to his connection with this company he has played an important part in the development of the beet sugar industry in the west and his knowledge of that work was a contributing factor to the early development of the Celite Products Company's business with the sugar industry which consumes a large portion of the "Celite" manufactured in the form of "Filter-Cel."

The management of the company is represented by an executive committee with headquarters in Los Angeles. This committee, besides Mr. Thatcher, consists of R. J. Wig and A. K. Fitger, vice presidents of the company.

Laying Dredging Pipe Line Under Ship Channel

[A problem which sand and gravel dredgers sometimes have to meet comes from dredging in a navigable river, where the channel cannot be closed by a pontoon line. This article from the *Engineering News-Record* shows how the difficulty was overcome in one case.—Ed.]

IN deepening the channel of the Columbia river near Walker Island at the mouth of the Cowlitz river, the Port of Portland Commission discovered it could dispose of some 1,235,000 cu. yd. of dredged material to the Long Bell Lumber Co. in its civic development at Longview, Wash. As dredging was on the Oregon side of the channel, crossing of the ship channel, accomplished by submerging the pipe, was necessary. Laying of the pipe was done as follows:

On the Oregon side of the river there was driven a landing stage of six piles protected by two dolphins. The 30-in. pipe was then assembled on the ordinary pontoons, one pontoon to each 32-ft. section of pipe, alternate connections being flexible rubber sleeves. A wire cable, running back to a snubbing post on each pontoon, was then fastened to the center of each length of pipe, and two 40-ft. wire cables, one at each end of each length of pipe, were fastened to the pipe and to a ¼-in. wire cable long enough to reach across the river.

Beginning at one end of the string of pipe, a derrick barge lifted each length, its pontoon being then slid out from under it. The pipe supported by the cable on the pontoon was left hanging just in the water. This having been done to each pontoon, the cables on the pontoons were then simultaneously slacked and the pipe lowered 5 ft. into the water. A tug was then made fast to one end of the string of pontoons and they, together with the submerged pipe, were towed across the river, the pontoons anchored and drawn into line and the pipe lowered to the bottom of the river. The derrick barge then raised one end of the string of pipe with its 33-deg. elbow and 64-ft. length of riser pipe onto the landing stage. Connection was then made with the dredge and with other sections of pipe on pontoons and light trestles running to the area to be filled.

Before the pipe was submerged a dragline was used on the bed of the river where the pipe was to rest to clear it of any snags or large obstructions. No difficulty was experienced in laying the pipe, the channel being obstructed for only 20 minutes. The length of pipe necessary to carry out the filling varied from 3300 to 6900 ft.

The work was done under the supervision of the chief engineer of the Port of Portland, J. H. Polhemus, with R. W. Nelson in charge.

Iowa Weighs Concrete Aggregate Used in Highway Work

R. D. CRUM, of the Iowa state highway department, in a letter to the *Engineering News-Record*, says that:

"As a result of experience in weighing concrete aggregates upon two concrete paving contracts in 1923, the Iowa Highway Commission has adopted the actual weighing of aggregates on road pavement construction as standard practice. No startling revolution in results on these two jobs was noted, but concrete as good or better than other concrete made of the same materials was produced, and some improvmeent in uniformity was noted. After the next construction season we will have much more extensive data from the construction of our 1924 program, and from cores to be cut from the work done this year.

"Our experience has been entirely satisfactory thus far, and in view of the facts that: (1) the method entails no added cost, (2) no loss in time or decreased production occurs, (3) weighing is admittedly a much more accurate way of measuring granular materials than by loose volumetric measurements and (4) that a valuable record of the amounts of materials used is secured, our only doubt is "why did we not take up this practice sooner?"

"Several conditions contributed to our desire to try out this method of handling aggregates. We found ourselves continually in controversy with contractors over the types of measuring boxes they wished to use, and many times we ran out of breath and used equipment which fell a long way short of our desires. We realized of course that we might improve this condition by making very rigid requirements in the specifications as to the measuring boxes, but it also occurred to us that it would also be possible to better control the mixtures by actually weighing the materials. This came the more naturally because the Iowa Highway Commission has for several years specified the proportions for paving mixtures by weight, and a part of our trouble has come from the necessity of converting our weight proportions into volumes, and the further necessity of changing mixtures due to changes in unit weight of raw materials.

"We do not claim that in theory, weight measurements are any better than volumes, for if all the characteristics are known, the proportions can be specified in either way to yield the same result, but we do believe that measurements by weight will be better done and more consistently accurate.

"Another important factor in the uniformity is the moisture content of the aggregates, especially in the sand. There is no doubt that variations in moisture content have a large bulking effect upon the sand and therefore a corresponding effect upon volumetric measures. Of course, if the proportions are based upon dry materials, changes in moisture will be on the safe side and the concrete will be richer, and the contractor will be out some extra cement, but the concrete will not be uniform. I assume, however, that what we want is a uniform mixture that will not contain more cement than the contractor is led to expect. By using weights, corrections for moisture can be easily and frequently made.

"We have felt that the advantages mentioned above are obvious and in the light of our experience upon actual construction we feel that by using this system a much more favorable condition will be set up for securing uniform results than has heretofore been the case. All paving contracts on the Iowa primary road system for 1924 will be let on this basis. About 100 miles is already under contract."

Portage Silica Plant Sold

THE Pacific Sand Co. has purchased the entire holdings of the Portage Silica Products Co., Portage, Wis., and the Portage Silica Products Co. is dissolved. The sand-lime brick manufacturing equipment will be sold and the plant used exclusively for preparing glass, foundry and chemical sands. J. N. Thouvenell is president of the Pacific Sand Co., Portage.

Traffic and Transportation

By EDWIN BROOKER, Consulting Transportation and Traffic Expert,
Munsey Building, Washington, D. C.

Proposed Changes in Rates

THE following are the latest proposed changes in freight rates up to week beginning March 17:

Central Freight Association

8070. Sand and gravel. Winona Lake, Ind., to Atwood, Bourbon, Etna Green, Larwill and Pierceton, Ind. (Rates in cents per net ton):

To	Present	Proposed
Atwood	69	50
Bourbon	69	50
Etna Green	69	50
Larwill	63	50
Pierceton	63	50

8080. Crushed stone. Monon, Ind., to Hasketts, Alida and Westville, Ind. Present, 90 cents per net ton; proposed, 77 cents per net ton.

8085. Sand, gravel and crushed stone. Indiana and Ohio on C. C. C. & St. L. Ry. to stations on the Michigan Division of that line. (Per net ton):

STONE, CRUSHED, FROM

Michigan Division To	Ingalls, Ind. Proposed	Cleaves, Ohio Proposed
Anderson, Ind.	$	$1.13
Alliance, Ind.	....	1.13
Emporia, Ind	....	1.13
Markleville, Ind.	....	1.13
Shirley, Ind.	.75	1.13
Knightstown, Ind.	....	1.01
Carthage, Ind.	.85	1.01
Farmer, Ind.	.85	1.01
Reinheimer's Switch, Ind.	.85	1.01
Henderson, Ind.	.85	1.01
Rushville, Ind.	.85	.85
Bennetts, Ind.	....	.85
Milroy, Ind.	....	.85
Williamstown, Ind.	....	.85
Sandusky, Ind.	1.00	.85

SAND AND GRAVEL FROM

Michigan Division To	Indianapolis, Ind. Proposed	Anderson, Ind. Proposed	Pendleton, Ind. Proposed
Anderson, Ind.	$	$	$ .69
Alliance, Ind.	.85	.70	.70
Emporia, Ind.	.85	.70	.70
Markleville, Ind.	.85	.70	.75
Shirley, Ind.	.81	....	.75
Knightstown, Ind.	.85	.70	.75
Carthage, Ind.	.85	.70	.85
Farmer, Ind.	.85	.70	.85
Reinheimers Switch, Ind.	.85	.70	.85
Henderson, Ind.	.85	.70	.85
Rushville, Ind.	.85	.70	.85
Bennetts, Ind.	.85	.82	.95
Milroy, Ind.	.85	.82	.95
Williamstown, Ind.	.85	.82	1.00
Sandusky, Ind.	.85	.82	1.00
Greensburg, Ind.	.82	.82	1.00

8091. Crushed stone. Bluffton, Ind., to Indiana. (Rates in cents per net ton):

To	Proposed	Present
Pendleton	98	*88
Ingalls	98	*88
Fortville	98	*88
McCords	98	*88
Lawrence	98	88
Brightwood	98	98
Indianapolis	98	98

*Intermediate to Lawrence, Ind.

8092. Sand and gravel. Lafayette, Ind., to Colfax, Ind., and Neoga, Ill. Present, 10 and 17 cents; proposed 83 cents and $1.01 per net ton.

8109. Sand and gravel. Macksville and Terre Haute, Ind., to Decatur, Ill. Present, 88 cents per net ton; proposed, 80 cents per net ton.

8110. Cement, common, hydraulic, natural or portland. Washington, Pa., to Waynesburg, Pa. Present, 10 cents; proposed, 7½ cents.

8111. Crushed stone. Woodville and Gibsonburg, Ohio, to Wickliffe, Ohio. Present, 16½ cents; proposed, $1 per net ton.

8112. Sand and gravel. County Spur, Mich., and Wolcottville, Ind., to La Grange, Middlebury and Shipshewana, Ind. (Rates in cents per 2000 lb.):

FROM COUNTY SPUR, MICH.

To	Present	Proposed
La Grange, Ind.	88	80
Middlebury, Ind.	92	88
Shipshewana, Ind.	92	88

FROM WOLCOTTVILLE, IND.

To	Present	Proposed
Middlebury, Ind.	92	88
Shipshewana, Ind.	97	88

Illinois Freight Association

2372. Stone, crushed. Carloads, minimum weight 90% of marked capacity of car, except when car is loaded to full visible capacity, actual weight will apply, but not less than 40,000 lb. from Joliet, Ill., to Peterson avenue, Chicago, Ill. Present, Class E rate, 8 cents per 100 lb.; proposed, 68 cents per net ton.

2376. Sand. Carloads, minimum weight 90% of marked capacity of car, except when loaded to full space capacity, actual weight will apply, but not less than 40,000 lb. from Gary, Ind., to Kewanee, Ill. Present, $1.72 per net ton; proposed, $1.50 per net ton.

2385. Sand, molding. Carloads, minimum weight as published in Pennsylvania Railway Tariffs I. C. C. F 1642, from Vandalia and Bluff City, Ill., on same basis as published from Greenville, Luts Spur and Mulberry Grove, Ill., e. g.:

To	Present	Proposed
Altamount, Ill.	$	$ .88
Alton, Ill.	....	1.26
Bloomington, Ill.	....	1.39
Cairo, Ill.	....	1.51
Decatur, Ill.	1.26	*....
Joliet, Ill.	....	1.51
Quincy, Ill.	....	1.89
Vandalia, Ill.	....	.63

*No change.

2386. Stone, crushed or ground, rubble and rip rap. Carloads, minimum weight 90% of marked capacity of car, except when car is loaded to full visible capacity actual weight will apply, from Alton, Ill., to Illinois points, e. g. (In cents):

To	Present	Proposed
Blue Mound, Ill.	88	86
Bloody, Ill.	88	86
Carpenter, Ill.	76	73
Clarksdale, Ill.	88	86
Decatur, Ill.	88	86
East Decatur, Ill.	88	86
Harvell, Ill.	88	86
Honey Bend, Ill.	88	86
Knights, Ill.	88	86
Litchfield, Ill.	76	86
Worden, Ill.	76	73

Via Illinois Terminal, Edwardsville Junction and Wabash Railway.

2401. Lime. Carloads, minimum weight, 60,000 lb. Proposal to establish commodity rate of 10 cents per 100 lb. from Alton, Ill., to Keokuk, Iowa. Present rate of 11 cents per 100 lb., minimum weight 30,000 lb. to be continued as an alternative rate.

288-J Lime, cement and plaster. In mixed carloads, minimum weight 40,000 lb. Proposed rates from St. Louis, Mo., and East St. Louis, Ill., to points in Illinois, e.g.: Alton, 10 cents; Aurora, 15½ cents; Bloomington, 12½ cents; Carrollton, 11 cents; Kankakee, 14½ cents; Mt. Vernon, 11½ cents; Tuscola, 12½ cents, etc. Present rates, Class C rates, classification basis.

2407. Crushed stone. Carloads, minimum weight 90% of marked capacity of car, from Thornton, Ill., to Pana, Ill. Proposed, 88 cents per net ton; present, $1.01 per net ton.

2408. Sand and gravel. Carloads, minimum weight marked capacity of car, from Chillicothe, Ill., to Seaton and Little York, Ill., via A. T. & S. F. Railway, Nemo and M. & St. L. Railway. Proposed, $1.01 per net ton; present, $1.13 per net ton.

Southern Freight Association

12900. Cement. Carloads, from all cement producing points to Greenville & Northern Railway stations. It is proposed to establish rates based 4 cents per 100 lb. higher than rates in effect to Greenville, S. C. The proposed revision represents reductions.

12925. Lime (calcium), acetate of dry, in bags or barrels. Carloads, minimum weight 36,000 lb., from Memphis, Tenn., to Kingsport, Tenn. Present rate, 62½ cents (sixth class); proposed, 39 cents per 100 lb., made in line, distance considered, with present rate from Lyle, Tenn., to Kingsport, Tenn.

12933. Stone, marble or slate, crushed or broken. Carloads, from Tate, Ga., to Winchester and Flemingsburg, Ky. Class A rates now apply. Proposed—To Winchester, $2.20; to Flemingsburg, $2.84 per net ton. Proposed rates are made in line with rates from and to other points on the L. & N. Railroad for similar distances.

12976. Slag. Carloads, from Birmingham, Ala., and Group and Alabama City, Ala., to Wrightsville & Tennille Railroad Co. stations between Tennille and Brewton, Ga., neither inclusive. Combination rates now apply. Proposed rate, $2.24 per net ton. Generally speaking, the proposed rate from Birmingham is made on basis of the proposed Georgia Scale, using Central of Georgia Railway distances from Birmingham to Tennille, Ga., plus W. & T. Railroad distances beyond. Rate from Alabama City is made same as proposed from Birmingham.

12999. Sand. Carloads, from Albany, Ga., to Atlanta, Ga. Present rate, $1.02 per net ton; proposed, 82 cents per net ton, made 5 cents per ton higher than present rate from Montgomery, Ala., to Atlanta, Ga.

13013. Cement. Carloads, from Nashville, Tenn., to points in the state of Louisiana west of the Mississippi river. Class rates now apply. Proposed rates: Same as now in effect from Chattanooga, Tenn., Richard City, Tenn., and Rockmart, Ga.

13034. Slag. Carloads, from Clarksville, Tenn., to Guthrie, Ky. Present rate, $2.80 per net ton (Class A); proposed, 80 cents per net ton, made in line, distance considered, with rates to and from other points on the L. & N. Railroad.

13043. Sand and gravel. In straight or mixed carloads, minimum weight 90% of marked capacity of car, except where cars are loaded to their visible capacity, actual weight will govern, from Columbia, S. C., to Wilmington, N. C. Present rates: Sand, $10.50 per car 20,000 lb.; gravel, $1.13 per net ton. Proposed, $1.44 per net ton, which is the same as proposed under S. F. A. Submittal 12928 on roadway building material from Columbia to Wilmington, and is on basis of the A. C. L. Railroad Virginia-Carolina interstate scale, which scale is the same as submitted by carriers to the Georgia Railroad Commission reduced 10%, effective July 1, 1922.

Southwestern Freight Bureau

347. Sand and gravel. To establish rate of $5.50 per car on sand and gravel, carloads, from Crow Creek, Ark., to Forrest City, Ark., when destined to points beyond via connecting lines, such rate being claimed necessary to enable shipper to meet competition at Benton and Newport, Ark.

378. Lime. To establish rate of 33½ cents per 100 lb. on lime (calcium), carloads, minimum weight, 30,000 lb., from Mercer, Ark., to New Iberia, La. The proposed change from Mercer is claimed necessary to place rate from that point on a proper relation to rate from Ruddells, Ark.

Texas-Louisiana

5917. Cement. Carload rates on, from Cementville, Texas, to points in Texas and Shreveport group. Proposition from shippers to establish on cement, carloads, from Cementville, Texas, to points in Texas and Shreveport group, the San Antonio rates, except where actual mileage rates makes less.

Trunk Line Association

11893. Lime. Carloads, minimum weight official classification, Eagle Mountain, Indian Rock, Lexington, Rocky Point, Staunton and Snyder, Va. (C. & O. Railway); Christiansburg, Kerns, Five Oaks, Ripplemeade, Tazewell, Riverton, Karo and Carson, Va. (N. & W. Railroad), to Midland, Mich., 25½ cents per 100 lb.

Western Trunk Line

3713. Sand and gravel. Carloads, from Valley, Neb., to Beatrice, Neb. Present, 6 cents; proposed, 5½ cents. Standard minimum weight basis.

3437. Stone, crushed. Carloads, from Linwood, Buffalo and Muscatine, Iowa, to C. M. & St. P. Railway points in Missouri. Present and proposed rates to a few points representative of the situation involved:

To	Present	Proposed
Powersville, Mo.	$2.30	$1.50
Gault, Mo.	2.40	1.60
Chillicothe, Mo.	2.70	1.65
Lawson, Mo.	3.10	1.80
Kansas City, Mo.	3.20	1.90

(Rates in cents per net ton.) Minimum weight, 90% of marked capacity of car except when weight of shipments loaded to full visible capacity of car is less than 90% of marked capacity of the car, the actual weight will apply, but in no case shall the minimum weight be less than 40,000 lb.

New England Freight Association

5984. Stone, broken or crushed, and articles

taking same rates in N. Y. N. H. & H. Railroad ICC F2505, in bulk, in gondola or other open cars, Branford (Pine Orchard Quarry), East Wallingford (Reed's Gap Quarry), Meriden, Meriden (York Hill Quarry), Mount Carmel, New Britain (Cook's Quarry), and Rocky Hill, Conn., to Worcester, Mass., $1 per net ton. Reason: Equalization of competitive conditions.

6017. Lime. Minimum weight, 40,000 lb., Danby, Vt., to Plattsburg, N. Y., 16. Reason: To place Plattsburg on a parity with other points of similar distance.

6022. Lime. Minimum weight, 50,000 lb., Lee, Mass., to Lowell, Mass. (B. & M. Railroad delivery), 17 cents, including switching charges of B. & M. Railroad at Lowell, Mass. Reason: Equalization of commercial conditions.

Freight Rates on Crushed Stone No Criterion of Rates on Gypsum Rock

ON the application of the Canada Cement Co. for adjustment of rates on gypsum rock, in carloads, from Caledonia, Ont., to Montreal and Ottawa, on a basis not to exceed the rates in effect on crushed stone, and in the matter of the order of the Board of Railway Commissioners, October 20, 1923, suspending supplement No. 69 to tariff No. 3074, of the Michigan Central railroad, the assistant chief commissioner has given judgment that the application in the first respect fails, as "it does not appear that crushed stone affords any necessary measure of what the rate should be in respect of gypsum rock." He pointed out that the application was developed from two standpoints: (a) the question of comparison of rates; (b) the application of the short-and-long-haul clause. For a number of years the published scale of mileage rates was the same for both gypsum rock and crushed stone, but, under the various orders making changes in rates since 1916, they were no longer so considered, gypsum being put on a considerably higher basis. He says:

"With regard to crushed stone, which is made the basis of the applicant's complaint, reference may be made to the special treatment given this and the reason therefor, as set out in Railway Association of Canada vs. Canadian Manufacturers Association et al., 26 Can. Ry. Case, 130, at p. 143. The following citation is in point:

"'At the hearing, I was very much impressed with the argument presented by those opposing any increase on crushed stone, sand and gravel, as, from the evidence adduced, and which was not contradicted by the railway companies, they must be making a fairly substantial profit in the transportation of these commodities; but I am arriving at this conclusion, to a very great extent, by the public necessities of Canada at the present time. Perhaps, next to the railroads, nothing is more urgently required than the improvement of our highways, and any increase in the rates on the materials entering into their construction must of necessity defer this much needed improvement; in fact, it was stated by Mr. McLean of the Public Works Department of the Province of Ontario, that they were now establishing in many parts of that province crushing plants at local centers; as the rates were already greater than the traffic would bear, and therefore any increased rate would not only deprive the public of a real necessity but would probably reduce the business and consequently the profits of the railways; therefore, I would give no increases in the rates on these three commodities.'

"That is to say, crushed stone for road-making purposes, which was regarded as the characteristic use, was given special consideration. It is admitted by the applicant that gypsum rock is not competitive with crushed stone for road-making purposes, on account of its being too soft.

"Under these circumstances, it does not appear that crushed stone affords any necessary measure of what the rate should be in respect to gypsum rock; and the application in this respect fails."—*Traffic World.*

Plaster Rate Revision

ESTABLISHMENT of new rates on plaster from Gypsum, Utah, to destinations on the Union Pacific and Oregon Short Line in Idaho, Oregon and Montana via Nephi, Utah; and from Lime and Gypsum, Ore., to points on those lines in the states mentioned from Laramie, Wyo., to points in Idaho, Oregon, Montana and Utah, not later than April 26, has been ordered in No. 13337, Nephi Plaster and Manufacturing Co. vs. Denver & Rio Grande et al., opinion No. 9143, 87 I. C. C. 159-69. Division 3 found the rates on plaster from Gypsum and from the Oregon points mentioned unreasonable and unduly prejudicial to the extent they exceeded rates made by the use of a scale prescribed in the order and hereinafter set forth.

A further finding was that the failure of the defendants to establish rates and tariff rules permitting the mixing of lime and plaster from Gypsum, Utah, and loading-in-transit privileges similar to those enjoyed by producers at Gypsum, Lime and other producing points in region was not unreasonable but unduly prejudicial. The order requires the removal of the undue prejudice not later than the day appointed for the establishment of the rates in conformity with the mileage scale.

The complainant asked for the establishment of rates from the three groups of origin, and particularly from Gypsum, Utah, via Nephi, to points on the Union Pacific and Oregon Short Line. It suggested a distance scale from the two Gypsums and from Laramie, the report said, with a holding of the present rates to Portland as maxima. It preferred, the report said, the Kansas plaster scale, but did not insist upon its adoption as a unit.

Objection was made by the railroads and intervening plaster and cement interests. The latter intervened in behalf of the existing adjustment. Intrastate rates in Utah and Wyoming were considered in so far as those in Utah related to the allegation of undue preference or prejudice between persons or localities in intrastate commerce on the one hand and interstate commerce on the other and in so far, in Wyoming, as it was alleged they constituted a discrimination against interstate commerce under the 13th section.

Defendants' and interveners' principal objection to the establishment of distance rates, the report said, was based upon the sparsity of population and general lack of development in the territory involved. One witness for the interveners, the commission said, urged that such an adjustment would result in restricting the movement of traffic to relatively short hauls, thereby decreasing the revenues of the carriers. The report said there were plaster plants in practically all the states comprising intermountain territory. It said that in view of the many and widely scattered producing points extremely long hauls of this low grade traffic could not reasonably be expected.

The report said the carriers admitted the loading-in-transit privilege to Oregon producers and its denial to the complainant constituted undue prejudice against the latter. It said they were opposed to any extension of the privilege and proposed to remedy the situation by withdrawing it at Gypsum and Lime, Ore.

The condemned rates are to be displaced by rates made in conformity with the following scale, on a 60,000 lb. minimum, with rates to Portland as maxima:

Distances	Rates Cents
10 miles and less	10
20 miles and over 10	11
30 miles and over 20	12
45 miles and over 30	13
60 miles and over 45	14
80 miles and over 60	15
100 miles and over 80	16
125 miles and over 100	17
150 miles and over 125	18
175 miles and over 150	19
200 miles and over 175	20
225 miles and over 200	21
250 miles and over 225	22
275 miles and over 250	23
300 miles and over 275	24
325 miles and over 300	25
350 miles and over 325	26
375 miles and over 350	27
400 miles and over 375	28
425 miles and over 400	29
450 miles and over 425	30
500 miles and over 450	31
550 miles and over 500	32
600 miles and over 550	33
650 miles and over 600	34
700 miles and over 650	35
750 miles and over 700	36
800 miles and over 750	37
850 miles and over 800	38
900 miles and over 850	39

Wisconsin Limestone Freight Rates Decision Expected

APPLICATION of Milwaukee traffic associations for a reduction of existing intra-state freight rates on limestone and lime sludge used for agricultural purposes, was taken under advisement by the state railroad commission after a hearing recently. Railroads of the state vigorously opposed the proposed reduction. If granted, the reductions will mean a saving of thousands of dollars to farmers of the state.

Portland Cement Output in February, 1924

Stocks Much Above and Shipments a Little Below Last Year at This Time

THE statistics shown in the following tables issued by the Department of the Interior and prepared under the direction of Ernest F. Burchard, of the Geological Survey, are based mainly on reports of producers of portland cement but in part on estimates. The estimates for February, 1924, were made necessary by the lack of returns from two plants. Production showed a slight decrease, as might have been expected in view of the highest recorded accumulation of stocks and the short month. Shipments showed an upward trend as compared with January, an encouraging evidence of early spring demand.

Stocks of clinker, or unground cement, at the mills at the end of February, 1924, amounted to about 6,902,000 bbl. compared with 5,458,000 bbl. (revised) at the beginning of the month.

The Bureau of Foreign and Domestic Commerce, of the Department of Commerce, reports that the imports of hydraulic cement in January, 1924, amounted to 153,732 bbl., valued at $250,799. The total imports in 1923 amounted to 1,678,636 bbl., valued at $2,964,098. The imports in January were from Belgium, 56,489 bbl.; Denmark, 55,982 bbl.; Norway, 36,394 bbl.; Sweden, 2681 bbl.; France, 1281 bbl.; Canada, 899 bbl.; Italy, 6 bbl. The imports were received in the following districts: Porto Rico, 55,982 bbl.; Los Angeles, 49,001 bbl.; Florida, 13,607 bbl.; New York, 11,456 bbl.; Washington, 10,127 bbl.; New Orleans, 9073 bbl.; South Carolina, 4474 bbl.; St. Lawrence, 6 bbl.; Massachusetts, 6 bbl.

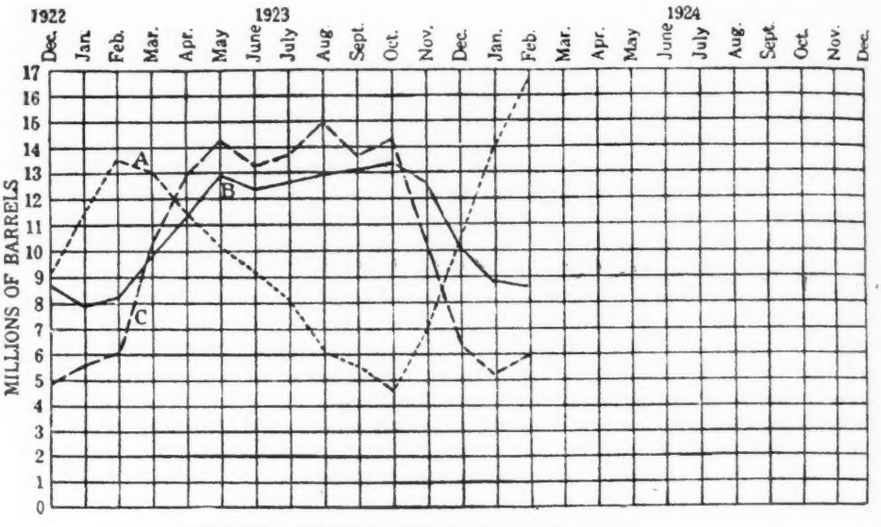
The exports of hydraulic cement in January, 1924, were 88,586 bbl., valued at $252,497, of which was sent to Cuba, 50,412 bbl.; to the other West Indies, 8810 bbl.; South America, 15,117 bbl.; Mexico, 6119 bbl.; Central America, 4595 bbl.; Canada, 584 bbl., and to other countries, 2949 bbl.

The statistics of imports and exports of hydraulic cement in February, 1924, are not available.

IMPORTS AND EXPORTS OF HYDRAULIC CEMENT, BY MONTHS, IN 1923 AND 1924, IN BARRELS*

Months	Imports 1923	Imports 1924	Exports 1923	Exports 1924
Jannary	71,686	153,732	74,169	88,586
February	20,529	‡	88,531	‡
March	66,521	.....	98,861	.....
April	76,899	.....	85,662	.....
May	88,480	.....	103,634	.....
June	111,559	.....	77,203	.....
July	286,106	.....	82,774	.....
August	324,008	.....	73,201	.....
September	215,785	.....	77,121	.....
October	172,051	.....	74,302	.....
November	140,590	.....	85,743	.....
December	104,422	.....	80,487	.....
	1,678,636	.....	1,001,688	.....

*Compiled from records of the Bureau of Foreign and Domestic Commerce.
‡Imports and exports in February, 1924, not available



(A) Stocks of finished portland cement at factories.
(B) Production of finished portland cement.
(C) Shipments of finished portland cement from factories.

PRODUCTION, SHIPMENTS AND STOCKS OF FINISHED PORTLAND CEMENT, BY DISTRICTS, IN FEBRUARY, 1923 AND 1924, AND STOCKS IN JANUARY, 1924, IN BARRELS

Commercial District	Production—February 1923*	Production—February 1924	Shipments—February 1923*	Shipments—February 1924	Stocks at end of February 1923*	Stocks at end of February 1924	Stocks at end of January 1924*
Eastern Pa., N. J., & Md.	2,128,000	2,600,000	1,229,000	1,361,000	4,188,000	4,069,000	2,830,000
New York	345,000	276,000	154,000	129,000	890,000	1,070,000	923,000
Ohio, W'n Pa. & W. Va.	742,000	708,000	550,000	461,000	1,235,000	1,728,000	1,481,000
Mich.	325,000	314,000	268,000	247,000	689,000	882,000	814,000
Ill., Ind., & Ky.	1,522,000	1,276,000	1,014,000	752,000	2,224,000	2,781,000	2,257,000
Va., Tenn., Ala., & Ga.	465,000	753,000	425,000	633,000	262,000	750,000	631,000
Eastern Mo., Ia., & Minn.	880,000	921,000	837,000	572,000	2,021,000	2,868,000	2,518,000
W'n Mo., Neb., Kan. & Okla.	517,000	403,000	416,000	436,000	986,000	1,227,000	1,260,000
Texas	312,000	363,000	251,000	268,000	271,000	400,000	305,000
Colo. & Utah	81,000	85,000	89,000	117,000	161,000	229,000	261,000
Calif.	702,000	745,000	767,000	818,000	144,000	300,000	373,000
Ore., Wash. & Mont.	191,000	144,000	90,000	139,000	525,000	507,000	502,000
	8,210,000	8,588,000	6,090,000	5,933,000	13,596,000	16,811,000	14,155,000

*Revised.

PRODUCTION, SHIPMENTS, AND STOCKS OF FINISHED PORTLAND CEMENT, BY MONTHS, IN 1923 AND 1924, IN BARRELS

Month	Production 1923	Production 1924	Shipments 1923	Shipments 1924	Stocks at end of month 1923*	Stocks at end of month 1924
January	*7,990,000	8,788,000	*5,628,000	5,210,000	11,477,000	*14,155,000
February	*8,210,000	8,588,000	*6,090,000	5,933,000	13,596,000	16,811,000
March	9,880,000	.....	10,326,000	.....	13,045,000	.....
First quarter	26,080,000	.....	22,044,000	.....	.....	.....
April	11,359,000	.....	12,954,000	.....	11,463,000	.....
May	12,910,000	.....	14,257,000	.....	10,144,000	.....
June	12,382,000	.....	13,307,000	.....	9,168,000	.....
Second quarter	36,651,000	.....	40,518,000	.....	.....	.....
July	12,620,000	.....	13,712,000	.....	8,081,000	.....
August	12,967,000	.....	14,971,000	.....	6,080,000	.....
September	13,109,000	.....	13,698,000	.....	5,533,000	.....
Third quarter	38,696,000	.....	42,381,000	.....	.....	.....
October	13,350,00	.....	14,285,000	.....	4,612,000	.....
November	12,603,00	.....	10,251,000	.....	6,991,000	.....
December	9,997,000	.....	6,408,000	.....	10,575,000	.....
Fourth quarter	35,950,000	.....	30,944,000	.....	.....	.....
	137,377,000	.....	135,887,000	.....	.....	.....

*Revised.

The Effect of Grading of Sand Upon the Properties of Sand-Lime Brick*

Results Obtained by Bureau of Standards Test

By H. V. Johnson

RESULTS of experiments on the effect of grading of sand upon the transverse strength and absorption of sand-lime brick were reported in the proceedings of the Sand-Lime Brick Association for 1921. This report was reproduced in ROCK PRODUCTS for January 28, 1922. The present report covers the effect of grading of sand upon the tensile strength, compressive strength and density of sand-lime brick. This work is merely a continuation of that mentioned above, and therefore the minor details of procedure which are not new will not be repeated.

In selecting the method of determining tensile strength, it was found convenient to mold the material in the form of briquettes so that they could be broken in an ordinary briquette machine. The bricks for compression tests were molded in a rectangular mold 2x4 in. in lateral dimensions, and a sufficient amount of material was tamped into the mold to result in a brick 2x2x4 in. when pressed. This shape was chosen instead of the 2x4 in. cylinder mold, for the rectangular mold has less depth of sand to be pressed, less frictional loss against the sides of the mold and a more uniformly pressed brick results.

The gradings of the sanded portions of each mix are given in Table 1, and the results of tests are given in Table 2. The values for tensile strengths are the average of five briquettes each, while the results for compressive strengths are an average of three determinations. The mean of the maximum deviations from the average tensile strength of each mix was 13.7 per cent, the range being from 22.8 to 1.8 per cent. The corresponding value for compressive strength was 5.8 per cent, ranging from 15.9 to 0.6 per cent. Density was determined on the bricks for compression tests after being dried in an oven. Values are given in grams per cubic centimeter.

The tensile strengths and transverse strengths have been plotted against compressive strengths on Fig. 1. The points, in a general way, lie along two straight lines, which indicates that tensile strength and transverse strength increase as the compressive strength increases. By referring to the table or results, it is seen that the cause of the increase in strength is the increase in the amount of very fine material in the mix. This conclusion will result from making a careful study of the gradings employed and the entire table of results. But the same conclusion will be reached with less trouble by comparing the results of tests on the mixes numbered 11 to 17, where the only change made was the gradual increase in the percentage of the finest grade of material, from 0 to 100 per cent.

It will be noticed that the first two increases in this fine material resulted in greater density, and in less absorption. With further increase in fine matreial, the density was decreased and the absorption was increased. The strengths in tension, bending and compression all increased regularly with the increase in fine material, and the greatest strength did not occur in specimens of the greatest density. The greatest compressive strength of all, 10,400 lb. per square inch, occurred where the sanded portion consisted of 50 per cent of 100-200 mesh

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TABLE I—COMPOSITION OF SAND PORTIONS OF SPECIMENS BY WEIGHT

No.	8-16	16-30	30-50	50-70	70-100	50-100	100-200	Through 200
1	76	18	5	....	....	1	0.3	....
2	72	16	7	....	....	3	2	....
3	52	25	13	....	....	7	3	....
4	29	23	17	....	....	13	18	....
5	31	21	16	....	....	14	18	....
6	37	20	14	....	....	13	16	....
7	28	29	14	....	....	13	16	....
8	28	20	23	....	....	13	16	....
9	28	20	14	....	....	22	16	....
10	28	20	14	....	....	13	25	....
11	38	26	20	....	....	16	....	....
12	33	24	18	....	....	15	10	....
13	26	19	13	....	....	12	30	....
14	22	16	12	....	....	10	40	....
15	19	13	10	....	....	8	50	....
16	9	7	5	....	....	4	75	....
17	....	....	....	....	....	....	100	....
18	100	....	....	....	....	....	....	....
19	....	100	....	....	....	....	....	....
20	....	....	100	....	....	....	....	....
21	....	....	....	100	....	....	....	....
22	....	....	....	....	100	....	....	....
23	....	....	....	....	....	....	....	100
24	50	....	....	....	....	....	50	....
25	....	50	....	....	....	....	50	....
26	....	....	50	....	....	....	50	....
27	....	....	....	50	....	....	50	....
28	....	....	....	....	50	....	50	....
29	....	....	....	....	....	....	50	50

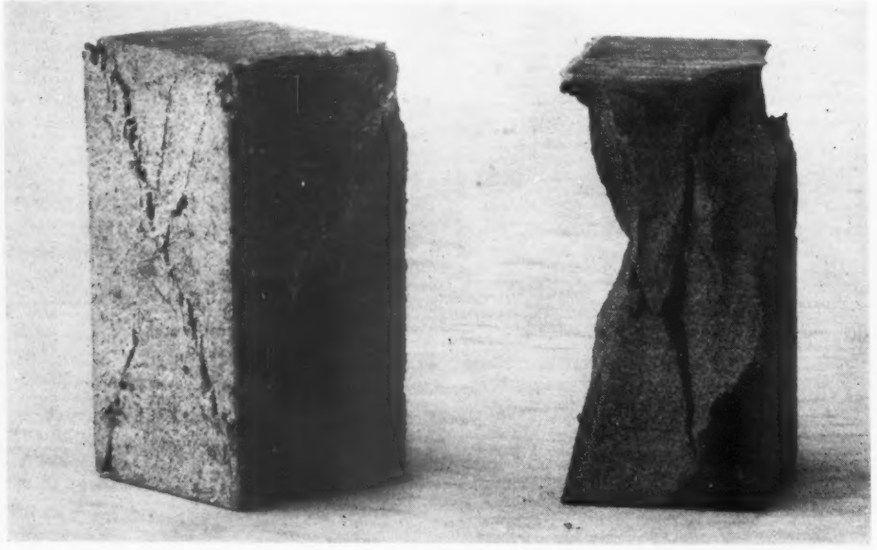
TABLE II—RESULTS OF TESTS

No.	Strength of Bricks, lbs./sq. in. Tensile	Transverse	Compressive	Ratios	Absorption. Per cent	Density Gms./cc.	Water retained on pressing. Per cent
1	128	252	1,948	1:2 :15.2	8.5	2.149	5.25
2	116	379	2,080	1:3.26:18.0	8.7	2.161	5.24
3	121	331	2,432	1:2.73:20.1	8.5	2.173	5.18
4	262	574	3,942	1:2.2 :15.0	8.0	2.192	5.36
5	216	678	3,820	1:3.14:17.7	8.1	2.187	5.42
6	191	603	4,342	1:3.15:22.7	7.7	2.191	5.24
7	308	669	4,059	1:2.17:13.2	8.1	2.183	5.36
8	366	713	4,026	1:2.0 :11.0	8.4	2.171	5.36
9	320	836	4,193	1:2.6 :13.1	8.0	2.175	5.72
10	285	842	4,122	1:3.0 :14.5	8.1	2.178	5.60
11	164	606	2,741	1:3.7 :16.7	8.0	2.155	5.42
12	263	634	3,096	1:2.4 :11.8	7.6	2.170	5.30
13	350	1,000	4,722	1:2.85:13.5	7.5	2.186	5.72
14	370	1,061	5,673	1:2.87:15.0	7.9	2.175	6.02
15	434	1,069	5,705	1:2.46:13.1	8.0	2.160	6.14
16	485	1,151	7,192	1:2.4 :14.8	8.8	2.124	7.04
17	511	1,291	6,819	1:2.5 :13.3	12.2	2.049	7.90
18	114	305	1,222	1:2.67:10.7	8.4	2.104	.....
19	235	504	2,303	1:2.1 :10.0	9.2	2.083	.....
20	394	762	4,252	1:2.0 :10.8	9.4	2.063	.....
21	392	1,080	4,561	1:2.75:11.6	10.9	2.063	.....
22	456	1,302	6,128	1:2.85:13.4	10.4	2.017	.....
23	764	1,817	7,203	1:2.38: 9.4	10.4	2.065	.....
24	370	556	5,772	1:1.5 :15.6	10.3	2.176	.....
25	451	869	6,593	1:1.93:14.6	10.3	2.158	.....
26	512	986	6,115	1:1.92:11.9	11.7	2.103	.....
27	449	1,077	6,420	1:2.4 :14.3	12.5	2.063	.....
28	493	1,159	6,052	1:2.35:12.3	12.1	2.036	.....
29	785	1,751	10,410	1:2.23:13.3	10.8	2.100	.....

Average = 1:2.5 :14

material, and 50 per cent passing a No. 200 sieve.

One point remains to be explained, and that is why the strength continues to increase with further additions of fine material after the maximum density has been obtained. This seems to be due, undoubtedly, to a better bond being formed between sand and lime when there is present a large amount of very fine material, which naturally facilitates chemical reaction. One disadvantage resulting from adding so much fine material that the density is decreased is the increase in absorption which results.



When tested to breaking the lines of cleavage show the uniformity of the material when finely ground

There is an interesting relation shown between the percentage of water retained by the bricks when pressed and the percentage of absorption, the latter always being the greater. At first thought, one might expect the two to be the same, but there is an expansion of the sand in the mold as the pressure is released, so that this results in a greater porosity than that measured by water retained when the brick is under pressure. Some further expansion doubtless occurs during the steaming of the bricks. In placing the briquettes into the jaws of the breaking machine, it was noticed that those had expanded most which contained the largest percentage of fine material. This is borne out by the results, which show that when the percentage of fine material was increased from 75 to 100 per cent, the percentage of water retained increased from 7 to 7.9 per cent, while the absorption increased from 8.8 to 12.2 per cent. In computing tensile strength, no correction was made for this expansion, as it was quite trivial compared to individual variations in strength.

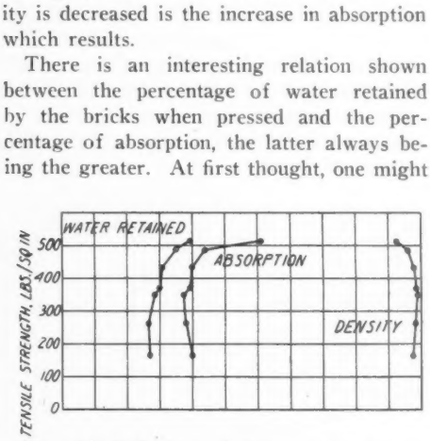


Fig. 2—Relations between water retained and absorption, density, and tensile strength

The influence of the fineness of the sand upon the properties of the resulting sand-lime brick has received some notice in the literature. Dr. Michaelis[1] advocated the use of two-thirds of coarse and one-third of fine sand for best results; but since he does not define coarse and fine sand, this is a little indefinite.

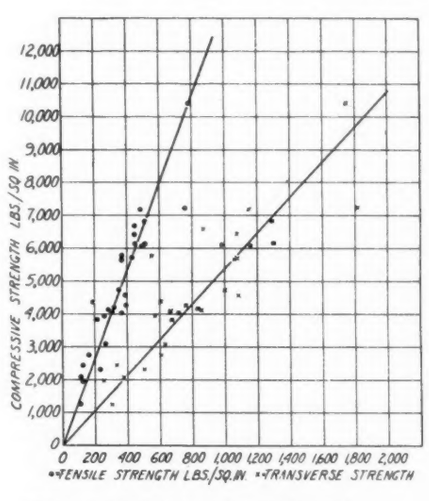


Fig. 1—Relation of tensile and compressive strength

Peppel[2] experimented with a coarse sand and a fine sand, and came to the conclusion that the effect of introducing very fine ground sand into a coarser mixture is to slightly lessen the crushing strength and increase the tensile strength. This conclusion is substantiated by a report of results on only three mixtures of coarse and fine sand. The blocks for these tests were made in a hand screw brick press, on which it was impossible to give each block exactly the same pressure. These circumstances tend to limit the dependence which can be placed on Peppel's conclusions.

Duerr[3] used some graded sands for making sand-lime brick, testing the brick for compressive strength, transverse strength and absorption. His conclusion was that for the best results, in sand-lime brick, the sand should contain at least 10% of 100 mesh or finer material.

E. Cramer[4] used 94% ordinary sand and 6% lime, which gave bricks of a compressive strength of 1672 lb. per square inch. When he used 91% ordinary sand, 3% fine sand and 6% lime, the compressive strength was 2632 lb. per square inch. The substitution of 3% of fine sand gave an increase of about 58% in the compressive strength.

Some experiments were made by Glasenapp[5] upon the amount of calcium hydrosilicate formed during the hardening of the brick. He concluded that the strength of sand-lime brick rests essentially upon the amount of calcium hydrosilicate formed during the hardening process, and that the finer grained the sand the more complete is the reaction between the sand and the lime.

Leduc and de la Roche[6] published some results on the use of a coarse sand and a fine sand. Their results agree with Glasenapp's findings in that there was more soluble silica formed during hardening when

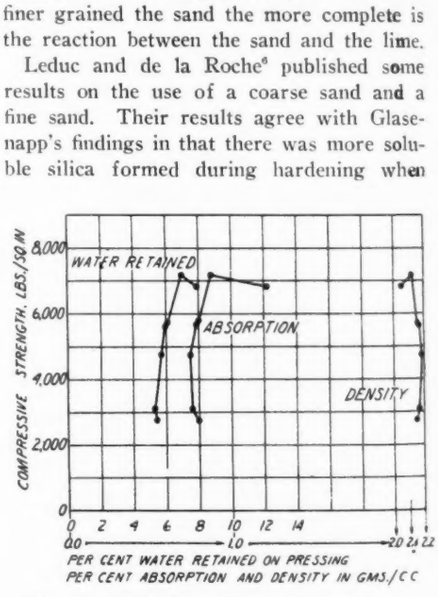


Fig. 3—Relations between water retained and absorption, density, and compressive strength

[1]Dr. W. Michaelis: wie muss der Sand beschaffen sein, um gute Kalksandsteine zu ergeben? Tonindustrie Zeitung, 25:763 (1901).

[2]S. V. Peppel: The Manufacture of Artificial or Sand-Lime Brick. Tn. Am. Cer. Soc. 4: 156 (1902). Tn. Am. Cer. Soc. 5: 168 (1903). Clay Worker, 42: 589 (1904). Bull. 5, Ohio State Geological Survey, 1905.

[3]H. O. Duerr: Report on Sand-Lime Brick Industry. Proceedings, Sand-Lime Brick Association, 1905.

[4]E. Cramer: Erfahrungen in der Kalksandsteinherstellung. (Zumischung von fein gemahlenem Sand). Tonind.-Ztg., 29:215. Feb. 23, 1905; 29:599, April 27, 1905.

[5]M. Glasenapp: Einfluss des Feinsand-Zusatzes zur Kalksandstein-Mischung. Tonindustrie Zeitung, 29:689. May 11, 1905.

[6]Leduc and de la Roche: Sand-Lime Products. Cement and Eng. News, 23:143, April, 1911.

fine sand was used instead of coarse sand. Considering the elaborate and careful work which they performed, it is to be regretted that they did not make some tests to determine the effect of fineness of sand upon the strength of the brick.

Parr, Ernest and Williams[7] experimented with mixtures of finely divided silica and lime. In making test pieces of these mixtures under steam pressure, it was found that the introduction of about four parts of sharp sand into a mixture of equal parts of lime and silica (one part) gave a product with much higher tensile strength than when no sand was used.

A finely divided condition of a material greatly increases its chances for chemical reactions. But it is possible to have finely divided silica which is not in a very active state. Experiments made in this laboratory on celite, or diatomaceous earth, have shown that no appreciable bond is formed between celite and lime when dampened and subjected to high pressure steam. So it is possible that the sand introduced into their mixture of silica and lime was in a more active state than the finely divided silica, which would account for the increase in tensile strength.

Parr and Ernest[8] experimented further with finely divided silica, with the hope that it might be used in sands lacking fine material for making sand-lime brick, and thus avoiding the expense of grinding sand. They came to the conclusion that the bonding material is the weakest part of the brick, and that best results were to be obtained by keeping the bond as low as possible, consistent with good bonding. The sands which they used contained nothing passing a 100-mesh sieve. They proceeded to supply the deficiency by adding varying percentages of fine silica from the natural deposits in southern Illinois. But fine sand, whether occurring naturally or produced by grinding, more than likely would have had a different effect upon the resulting brick than did the fine silica, and therefore their conclusions are not reliable.

Kirkpatrick and Lapham[9] ground Ottawa sand in a ball mill, divided it into three grades and re-combined these grades in varying proportions, adding 10% of lime. The specimens were pressed in the shape of cylinders and tested for absorption and compressive strength. Their conclusion was that the addition of sand finer than 100-mesh in amounts up to 20% by weight caused increases in the compressive strength of the brick, but that further additions did not give much greater increases in strength.

The results of our present research do not support this last statement, for the results show an increase in strength with all additions of very fine material. It should be noted that Kirkpatrick and Lapham used a prepared material consisting of ground quartz, instead of natural sand. Furthermore, their specimens were molded in a cylinder 3 in. high by about 1.6 in. diameter, under a pressure of 5000 lb. per square inch. These were not optimum conditions, for it is difficult to compress sand in a pipe of so small a diameter. The sand in the end receiving pressure from the plunger will be made much more compact than the sand in the other end. Then 5000 lb. was comparatively a low molding pressure. Under these circumstances, it is not to be expected that results will check very closely with those obtained under more favorable conditions for developing the greatest possible strength of the mixtures.

In a case where coarse sand adds to the compressive strength of the brick, its action can be explained as follows: A uniform material fails under compression along definite lines of cleavage. (See photograph.) The effect of the introduction of coarse particles would seem to be a question of the relative shearing strength of these particles and of the matrix or bonding material. Where the coarse sand grains are stronger than the matrix, they would act as so much reinforcement along the planes of cleavage; if they were weaker than the bonding material, then they would act as points of weakeness along the planes of cleavage.

The maximum compressive strength obtained by Kirkpatrick and Lapham was about 6500 lb. per square inch. Results of the present research show a maximum compressive strength of 10,400 lb. per square inch. And an inspection of the fractured bricks, in this research, showed that the quartz grains were broken in cases where coarse sand was used. The more favorable conditions for developing a very strong matrix, one which exceeded the strength of the coarse sand grains, is offered as the more probable reason for the lack of agreement of our conclusion with that of Kirkpatrick and Lapham.

Conclusions

1. With an increase in fine material, a greater duration of pressure is necessary in order that the indicating beam of the machine may come to the same stability; this increase will also result in more expansion of the material on releasing the pressure and also during steaming.

2. The tensile, transverse and compressive strengths of sand-lime bricks are increased as the proportion of very fine material passing a No. 100 sieve is increased.

3. This increase in strength is not limited to that increase in fine material which results in greatest density, but increases with further additions of fine material, which undoubtedly facilitates the chemical reaction that produces the bonding material in the brick.

4. The average ratios for the tensile strength, modulus of rupture and compressive strength were found to be, in these experiments, 1:2.5:14. The ratio of modulus of rupture to compressive strength is 2.5:14 or 1:5.6, as compared to a ratio of 1:4.6, taken as an average ratio from 10 makes of commercial sand-lime bricks.

5. The disadvantage attendant upon adding very fine material to such an extent that the density decreases is the resulting increase in absorption.

[7]Parr, Ernest and Williams: Studies in the Uses of Finely Divided Silica. J. Ind. Eng. Chem., 1:692. October, 1909.

[8]Parr and Ernest: A Study of Sand-Lime Brick. Illinois State Geological Survey, Bulletin 18 (1912).

[9]Kirkpatrick and Lapham: Effect of Size of Sand upon Strength and Absorption of Sand-Lime Brick. Proceedings Sand-Lime Brick Association, p. 11 (1919).

[10]Does It Pay to Grind Sand for Making Sand-Lime Brick? Brick 26:181, March, 1907. Tonind-Ztg., 31:871, June 20, 1907.

[11]Korngrosse des Sandes bei der Kalksandsteinherstellung. Toning.-Ztg., 27:2013 (1903).

Determining Presence of Shale in Aggregate

TO determine the presence of shale in aggregate, F. C. Lang, professor in the experimental engineering department of the University of Minnesota, and of tests and inspection for the Minnesota state highway department, subjects samples of gravel to immersion in zinc chloride, saturated solution. Because of its lower specific gravity shale rises to the surface while the satisfactory gravel remains at the bottom. "Few materials surpass shale in excellence for graveling roads," said Professor Lang. "It is only when it is used as an aggregate in concrete that shale is unsatisfactory."

[The editor may add that he has used this method for determining the presence of lignite in sand and gravel. It was not altoghether satisfactory, as only a part of the lignite floated, while what was wanted was a quantitative method that would float all of it so that the lignite could be figured as a percentage. However, it has its value as a quick and simple test for shale, lignite or any other material of less specific gravity than quartz.]

Pennsylvania Rate Hearing on March 24

PRODUCERS of sand and gravel in the western Pennsylvania district have filed a complaint with the Interstate Commerce Commission alleging discriminatory rates as compared with slag and crushed stone, and the hearing has been set for March 24 at Pittsburgh.

The complaint, Docket No. 15329, charges that the present rates on sand and gravel are both excessive and unreasonable, as well as prejudicial and discriminatory as compared with rates on competing materials, such as slag and crushed stone.

Sand and gravel freight rates in western Pennsylvania, eastern Ohio and certain parts of New York and West Virginia are undoubtedly the highest of any in the United States and a determined effort is to be made to have them reduced to a reasonable level.

The western Pennsylvania producers have retained Edwin Brooker, Munsey building, Washington, D. C., to protect their interests. The 20 railroads named as defendants will be represented by counsel and officials.

Cement Outlook in Japan Not So Bright

Hoped for Reconstruction Boom Fails to Materialize; Local Cement Plants Hit

THE EDITOR: The enclosed newspaper clipping from one of the Tokyo dailies may be of interest to ROCK PRODUCTS. It gives a very good resume of conditions in Japan at the present time.

Although the present outlook is not very encouraging to the cement manufacturers, the future should hold good things in store for them. But the big question is: "How far off is that future?"

Everybody is waiting for the government to adopt some definite policy regarding reconstruction. So that's about the way things stand at the present time.

J. A. ROBERTS.

Chichibu-Machi,
Saitama-Ken, Japan.
February 25, 1924.

The newspaper clipping reads as follows:

The imaginary prosperity of reconstruction which has illumined the way of troubled but hopeful business people thus far now fades from their sight. Darkness thickens ahead. Despair seizes many of them.

Particularly as reconstruction purchases in the United States and Europe are here and landed their disappointment is more bitter than any one can imagine who are not interested in reconstruction business.

Those men are now seeking relief in two ways. One is adopted by those whose trouble is indirect. The other is the tactics which men whose trouble is direct already have adopted.

Portland cement manufacturers and lumber importers are the best examples of those latter. It may be remembered that Japanese portland cement manufacturers started lively enterprises to enlarge and improve their plants so that they might make most of the chance immediately after the quake.

Hasten Completion

Some manufacturers whose plants were in course of construction at the time of the quake also hurried up the completion of their factories.

Up to the close of last year the capacity of the Japanese portland cement industry was enlarged, as shown in the list below:

Companies	Enlarged capacity (in barrels)	New cos. capacity
Asano Portland Cement	6,720,000	.....
Onoda Portland Cement	300,000	.....
Toyokuni Portland Cement	500,000	.....
Iwaki Portland Cement	400,000	.....
Oita Portland Cement	900,000	.....
Sakura Portland Cement	180,000	.....
Osaka Yogyo	240,000	.....
Chichibu Portland Cement	.....	840,000
Ube Portland Cement	.....	300,000

The total of additional capacity was up to 10,380,000 bbl. This means roughly the doubling of the industry's capacity.

Now reconstruction demand is indefinitely deferred, it is quite easy to understand that mills see a fearful source of trouble in the increased capacity and the piles of their products idly laid in warehouses. Thus far they have tried to wait and see, retaining their faith in the government and the diet. But they can do so no longer.

Dump Goods

Some of them have accordingly started their dumping in Java, Manila, Singapore and other adjacent places. Of course, there they have to fight German, Chinese and Italian manufacturers whose products are less expensive than theirs. But they have no alternative.

A prominent man in the industry says that if Japanese manufacturers wedge in they have to offer their goods at 3.70 yen to 4 yen per barrel. This means a loss ranging between 0.50 yen and 1 yen per barrel to Japanese manufacturers.

* * * * *

The root of all troubles is to be found in the depreciation in the people's buying capacity. An American business man who has just arrived here to study how he can share in reconstruction business sees it. He has just declared that to buy necessary materials and rebuild their towns and houses, people in Tokyo and Yokohama are too short of capital.

"I have approached almost all merchants of standing with my offers on easy terms," says he, "and as a result I have found that I can wedge in if I am prepared to give credit to those men."

Prices of Foreign Cement

The demand for cement was good during the month, with German cement quoted at 8s, 3d., and Belgian cement at 42 Belgian francs, the latter representing an increase of 2 francs over January quotations. Germany led in arrivals of cement at Rio de Janeiro, with Italy, England, France, and Norway following in the order named. Arrivals at Santos were led by Sweden, with Holland, Germany, and France following.—Commerce Reports, Mar. 3.

West Virginia Sand and Gravel Plant Sold

THE Standard Brick and Supply Co. interests have bought out the plant and business of the West Virginia Sand and Gravel Co. and will operate it under the old name.

George E. Sutherland, vice-president and general manager of the Standard, while continuing in that capacity, will also be the new president and general manager of the West Virginia company. S. M. Gallagher, secretary of the Standard company, will also be secretary of the West Virginia company. Oscar F. Henry, treasurer of the Standard company, will officiate as treasurer of the West Virginia company. L. F. Sutherland, who has been superintendent of transportation for the Standard company, has been transferred to the superintendency of the West Virginia company. The business office and sales department of the newly acquired company will be transferred to the office of the Standard Brick and Supply Co., 813 Kanawha St., and general offices of both companies will be maintained jointly there.

The Standard Co., operates a plant just beyond West Charleston and a quarry on the hilltop below Kanawha. The West Virginia Sand and Gravel Co. has been carrying on a materials supply business along Elk river on the upper west side and that plant will be continued there by the purchasers. It has been heretofore owned principally by Hinton interests headed by R. F. Dunlap, but Kelley E. Reed, of South Charleston, has been managing the enterprise.

New Aggregate Firm in Atlanta

ATLANTA Aggregate Co. is a new firm in Atlanta, Ga., that has recently opened sales offices and show rooms at 207 Walton Bldg., handling the products of the Birmingham Slag Co., of Birmingham, Ala., in the Atlanta territory, and the Arrowhead sand and gravel produced at the plant of the Montgomery Gravel Co., at Montgomery, Ala. W. M. Center, manager of the new company, and J. A. Glozer, associated with him in the business, have both been identified with the rock products industries in the southeast for several years.

Lyman-Richie Co. To Build Plant Near Kearny, Neb.

THE Lyman-Ritchie Co. of Omaha, which is one of the largest producers of sand and gravel in the United States, has entered into a lease for 120 acres of land, near the Platte river and just west of the Burlington tracks, on the north side of Kearney, Neb., and plans to install and operate a large gravel and sand pit there. A small spur will be installed to facilitate loading and moving the gravel. It is stated that the pumping and loading equipment will be of such dimensions as to permit loading a car every 15 minutes. This firm has the contract for furnishing gravel to the Allied Construction Co., to be used in surfacing the D. L. D.—*Kearney, Neb., Hub.*

Kirkpatrick Sand and Cement Co. Builds New Plant

THE Kirkpatrick Sand and Cement Co. of Birmingham, Ala., is building a new sand and gravel plant at Jackson's Lake near Montgomery, Ala., to replace the plant which they have been operating for a number of years.

The suction dredge has already been completed and pumping started. The washing and screening plant will be finished in about 60 days.

The capacity of the dredge is 35 cars per day. It is operated by a 200 hp. full Diesel engine which is belt connected to a Morris pump.—*Dixie Manufacturer.*

New Egyptian Portland Cement Co.

AT a meeting of the board of directors of the New Egyptian Portland Cement Co. of Detroit, Mich., the following officers were elected: Maynard D. Smith, president and general manager; E. R. Sullivan, vice-president and general sales manager; C. A. Bray, secretary and treasurer; John A. Acker, assistant general manager. The following directors were elected at the stockholders' meeting: Maynard D. Smith, Port Huron, Mich.; C. A. Bray, Detroit, Mich.; C. C. Peck, Port Huron, Mich,; Lyman A. Holmes, St. Clair, Mich.; Robert D. Baker, Detroit, Mich.; S. W. Traylor, Allentown, Pa.; E. R. Sullivan, Detroit, Mich.

The company reports a very satisfactory season of 1923 and prospects for 1924 are very good indeed.

Eight per cent in dividends were declared during 1923.

The company is commencing the installation of another unit at Port Huron, Mich., which will increase the output to 5000 bbl. per day from its two plants.

Prices of Raw Rock Phosphate and Agstone in Illinois

THE Will County Farm Bureau has received the new prices on raw rock phosphate for 1924. The phosphate will come through the Illinois Agricultural Association.

The new price for 13% raw rock phosphate is $6 per ton f.o.b. Tennessee. Anyone desiring to secure phosphate in bags will have to pay $2 per ton extra for 200-lb. burlap bags, $2.85 for 100-lb. burlap bags and $2 per ton for 80-lb. to 100-lb. paper bags.

Where the customer furnishes his own bags, it will cost 60c per ton for bagging the phosphate in 200-lb. bags and 75c per ton for the 100-lb. bags. The freight rates to Will county are approximately $4.50 per ton, thus laying the phosphate down in Will county as a cost of approximately $10.50 a ton. Where the phosphate is bagged, it will cost $12.50 or when the bags are furnished, it will cost $$11.10.

The limestone prices to farm bureau members are 50c a ton at the quarries. The freight rates range from 50c to 63c per ton on most roads, thus laying the stone down at from $1 to $1.13 per ton.—*Joliet, Ill., News.*

Calcium Arsenate to be Made by New Process in Alabama

THE *Dixie Manufacturer* states that the Gulf States Chemical and Refining Co. will shortly produce calcium arsenate by a new electrolytic process, which is said to yield a very pure product. A feature of the process is the saving of byproducts, notably hydrogen gas.

To Manufacture Aluminate Cement

THE Atlas Aluminate Cement Co., 25 Broadway, New York, recently organized with capital of 1500 shares, no par value stock, is making a thorough investigation of aluminate cement with the expectation of manufacturing the product in the course of a few months. C. R. Hulsart heads the company.

Marquette Cement Manufacturing Co. Establishes Sales Office at Memphis

THE sales force and office equipment of the Cape Girardeau plant of the Marquette Cement Manufacturing Co. is to be moved from Cape Girardeau to Memphis. The move will be made to place the sales force nearer the center of the distribution district of the corporation.

Every employe connected with the sales office will be transferred to the Memphis office, with the exception of Lee Bagby, traffic manager, who will transfer his offices to the plant in South Cape Girardeau. He will be maintained here to handle traffic for outbound cement shipments of the local plant.

Most of the shipments of cement made from here go to Southern points, especially in Tennessee, Arkansas and Mississippi, it was stated, and it was decided to place the sales office nearer the center of the district. —*Cape Girardeau Missourian.*

Work to Begin on Pueblo, Colo., New Cement Plant

WORK on a new cement plant to be constructed near Carlile, on the west line of Pueblo county, Colorado, will be started soon, according to information received by officials of the Arkansas Portland Cement Co. This company now holds deeds to 700 acres of land near Carlile.

The first plant will consist of two kilns of 1000 bbl. capacity each.

Water rights dating back to 1871 have been secured with the acreage for the new cement plant. The promoting company has also taken into consideration building sites and has already secured option on a suitable location for a town site two miles south of the state highway which runs through Canon City.

Land secured for material supply to the new plant includes the ranches of J. N. Carlile and C. J. Hobson, both of whom homesteaded the land in 1870. These two ranches constructed a ditch for irrigation from the river and their water rights dates from 1871, when the ditch was completed. Dr. G. D. Cummings of Florence is one of the principal promoters of the new plant.

The site chosen for the new plant is on the north side of the Arkansas river on the Rio Grande railroad.

Alabama Considering State Cement Plant for Convict Labor

ACCORDING to the Montgomery, Ala., *Advertiser* the Alabama State Board of administration is considering the advisability of starting a state cement plant to be operated with convict labor. The paper goes on to say:

"As to a state operated cement plant, it is stated that there are large deposits of cement rock on lands now owned by the state, a fact that would figure largely in cutting down the initial expense of establishing such a plant. Another factor which would figure materially in the manufacturing of cement by the state, would be the employment of convict labor. It is claimed that this labor could be used to equal advantage in a cement manufactory, as in cotton factory, several of which are now operated by the state largely by the labor of convicts.

"The primary purpose of the establishment, equipment and operation of a state owned plant for manufacturing cement, would be to provide cement used in the construction of state roads it is stated. The residue, it was stated further, would be sold on the open market, thus providing for disposal of the overplus of production, if any."

Cement Company Tunnels Under Railroad Track to Get to Raw Materials

THE finest large piece of cement work in that part of Michigan and an engineering project that has required several months to construct is the tunnel of the Alpha Portland Cement Co. under the Grand Trunk Western railway tracks, which is now being completed. The approximate cost of the tunnel is $50,000, and it is 14 ft. wide, 12 ft. high and nearly 110 ft. long. It is reinforced with a cement wall ranging from 4 to 6 ft. in thickness. These top slabs are 18 ft. long, 2½ ft. thick and 6½ ft. wide and weigh 22 tons each. There are 10 of them. Construction work started November 10 and the job is being done by Hamer, Paskins & Houck of Chicago. The new underground way will, when completed, give the cement company access to the large deposits of limestone in the south fields across the railroad right-of-way, adjacent to the present quarry, the tunnel allowing the free movement of the steam shovels and the running of locomotives for the quarrying of the rock and the transportation of the raw materials to the plant. A 20-year supply of raw materials in their southern 50-acre tract for making portland cement will be opened by the new tunnel. Excavating in the new tract will begin soon. The total output from the Bellevue cement plant last year amounted to 556,945 bbl. The year's output is expected to exceed that of last year.—*Michigan Contractor and Builder.*

New Lime Plant of Marble Cliff Quarries Company

An Example of the Modern Tendency to Convert All the Raw Material into the Best Commercial Form

THE new lime plant of the Marble Cliff Quarries Co., just outside of Columbus, Ohio, is an excellent example of the modern business idea, which is to convert as much as possible of the raw material into those manufactured products for which there is the best market. It is also a good example of the rapid progress that is being made in lime manufacture at the present time. Up to a generation ago one lime kiln much resembled any other lime kiln, and the word brought to one's mind a rough stone construction belching out black smoke through every crack and crevice. There are still a few such plants running in this country, but they bear no more resemblance to the modern plant, whether of shaft kiln or rotary type, than a "horse and buggy" bears to a limousine.

This company, as everyone familiar with rock products industries knows, has been a manufacturer of limestone products for a number of years, producing flux stone, stone for chemical lime, ballast and commercial crushed stone in its various sizes, including limestone sand for use in fine concrete aggregate and other purposes. It has also been one of the comparatively few companies to successfully wash stone free from clay and foreign matter, making a valuable and saleable material out of what has for many years been discarded in many quarries and piled into heaps that resembled mountains.

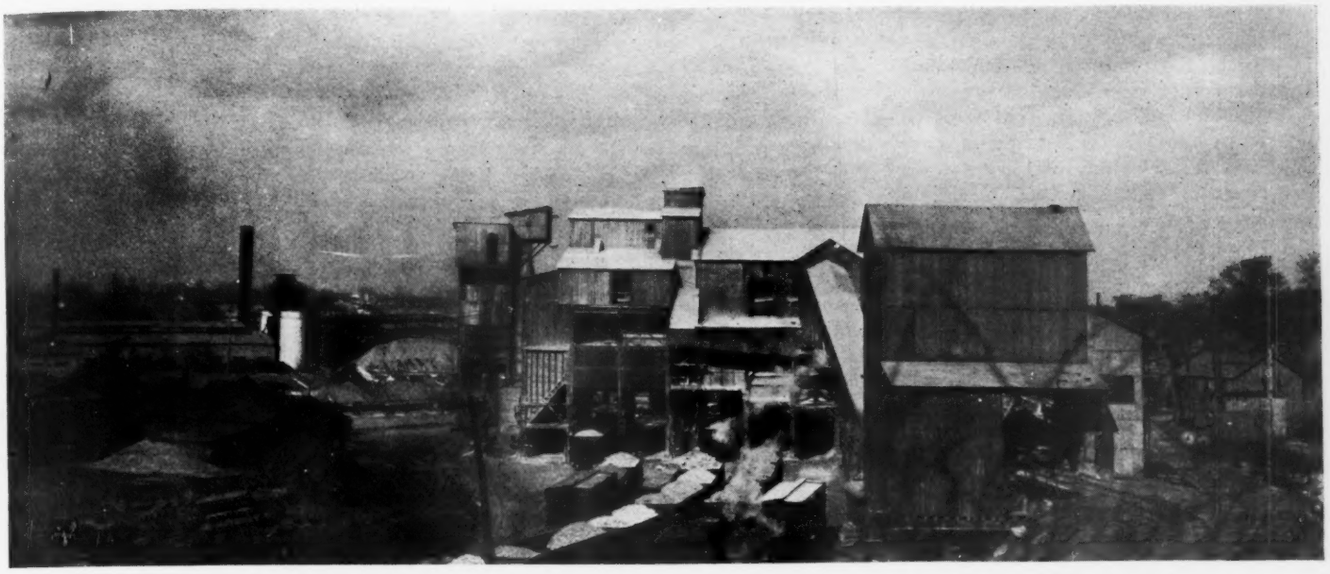
General view of new Marble Cliff rotary-kiln lime plant near Columbus, Ohio

Crushing and Washing Plant

A description of the crushing and washing plant and the quarry has already been published in this paper (see ROCK PRODUCTS for December 31, 1921), but in order to understand the relation of hydrated lime production to the other activities of the plant a few words of general description are necessary.

The quarry from which the stone is obtained is situated about a mile from the group of plant buildings, which includes the primary crushing plant, the washer and the new lime plant, besides warehouses, offices and like buildings. The quarry is equipped with the Woodford centrally controlled electrical haulage system, 12 cars of 14 tons' capacity each delivering an average of 3000 tons daily to the primary crushing plant. A counterweighted car-dump empties the cars into the No. 21 Allis-Chalmers gyratory crusher and the product of this crusher goes to the screening plant by way of a 42-in. belt conveyor.

The primary screens of this plant are two large rotary screens with round holes running from 2½ in. to 8 in. The larger sizes of stone from this screen are sold for flux and for chemical limestone. The smaller sizes go to the washing plant. It has been found that all the dirt and clay from the quarry goes through the 2½-in.



Primary crushing plant in the foreground; washing plant and new lime plant at the left in the background

holes, which means that only a comparatively small portion of the total tonnage has to be washed in order to obtain a clean product. The oversize of these screens goes to the secondary crushers and then to the secondary screening system.

At the washer the minus 2½-in. stone is fed to a rotary scrubber, 20 ft. long and 9 ft. in diameter. A thorough scrubbing is necessary to break up lumps of clay as well as to thoroughly scour the surface of the stone. From the scrubber it goes to a set of Link-Belt (Dull) screens of the same type that is so much used in plants for washing sand and gravel. These have 2½-in., 1¼-in., ¾-in. and ½-in. holes. The finest screen has 5/32-in. perforations and the material that passes this screen goes to the chain drag sand washers. The coarsest size is sold for flux and the sand and finer sizes for concrete aggregate and the like.

The 35-ft. rotary kiln and setting from gallery above the gas producer

Kiln Feed Is Material Less Than ½-in.

It is the stone passing the ½-in. screen and retained on the 5/32-in. screen which is the feed of the lime plant. While this is a regular commercial size, the demand for it is less than for the coarser sizes, and what is of more importance, it is a size well adapted to burning in a rotary kiln, although somewhat smaller than that which is usually burned. It is elevated to a hopper which feeds the car of an aerial tramway, made by the Interstate Equipment Co. This device is semi-automatic. When the car has been filled from the hopper it

View of lime plant from above quarry, with crushing and washing plant at the extreme right

runs across on the cables to the bins of the lime plant, where it is automatically discharged and returned to the filling point. It may be set to dump at any intermediate point and it is intended to use it in this way for building a long storage pile that will reach from the washer to the lime plant, to be afterward reclaimed by a locomotive crane.

A part of the feed to the lime plant comes from the other, and older, washer that stands at a considerable distance from the lime plant. This part of the feed is brought in on standard gage cars which are dumped into a track hopper and sent to the feed bins by means of a short belt conveyor and a bucket and belt elevator.

The feed flows from the silo type bins through two adjustable gates which feed a shaking conveyor. This conveyor acts as a feeder and discharges into the foot of an elevator that feeds the kilns through a long spout that passes through the dust settling chamber of the kilns.

The feeder and elevator, as is the case with practically all of the elevating and conveying machinery in the plant, is of Jeffrey design and make.

Washing plant and loading hopper for aerial tramway

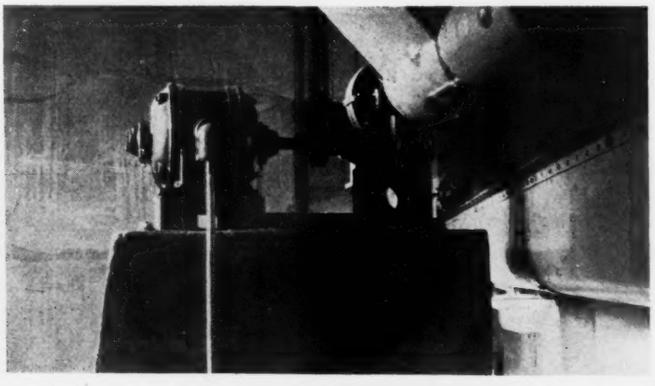
Tendency to Long Kilns

The kiln is 135 ft. long and has a clear inside diameter of 8 ft. It is made by the Worthington Pump and Machinery Corp. L. H. Eberhart, who is in charge of the plant, says that this length is considered conservative even for a plant burning lime. Earlier rotary kilns in the lime industry were much shorter, but the present tendency is to make them longer, kilns 175 ft. long being already in use, while 200-ft. kilns have been projected if they have not already been built. It has been found that, up to a certain point at least, increasing the length has resulted in a decrease in full ratio. It is said that the best full ratio obtained by a rotary kiln to date is just under 1:4.

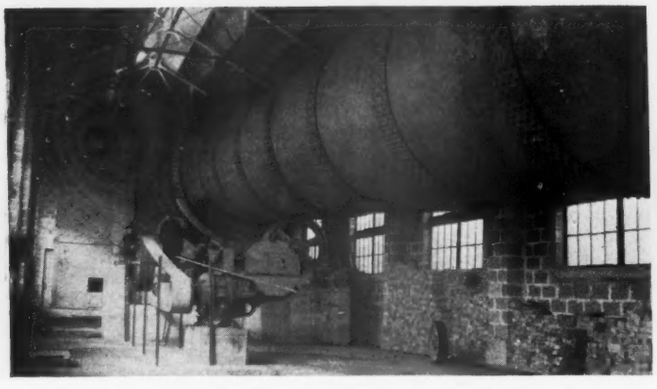
The kiln is fired with producer gas made in a producer designed especially for lime burning by R. D. Wood & Co. Steam is fed to the kiln with the gas, as

Receiving end of aerial tramway

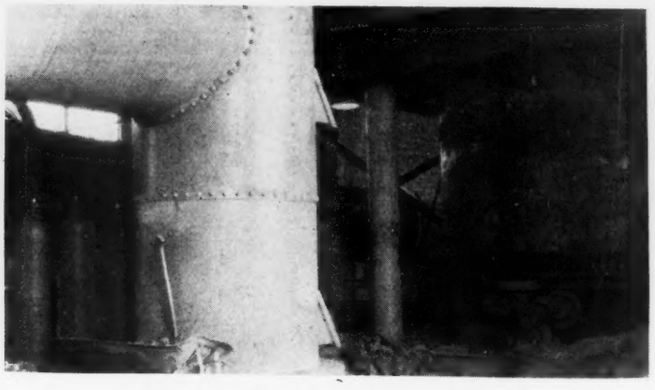
Track hopper, belt, and elevator to feed stone to kiln bins



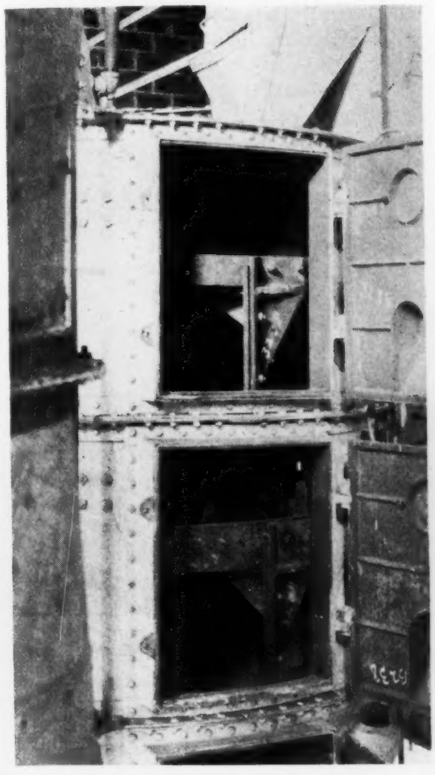
Drive of 9x12-in. screw conveyor drawing lime from bins and hydrator



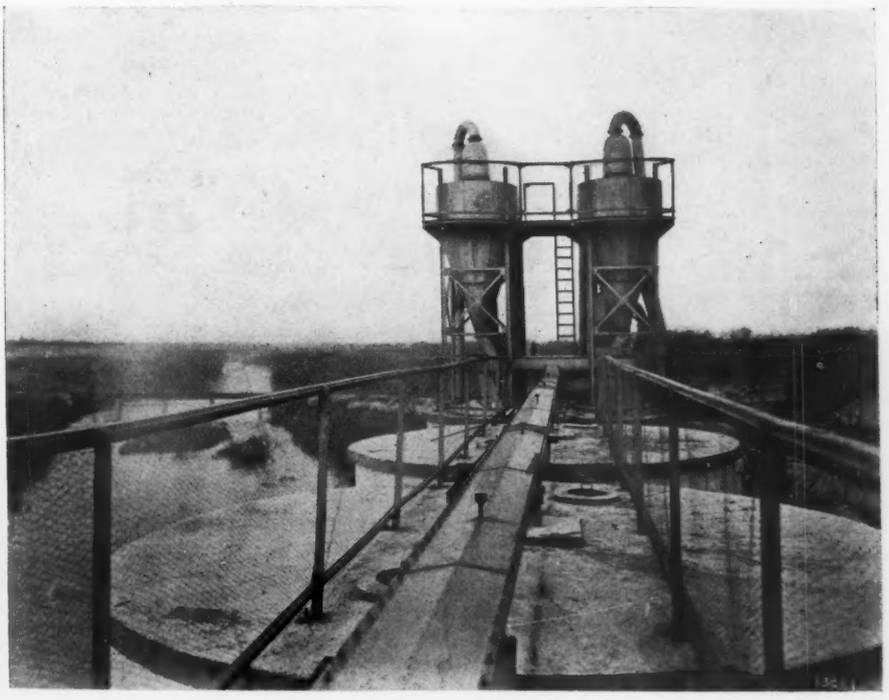
View of the 135-ft. kiln from below



The 48-in. gas main and gas producer



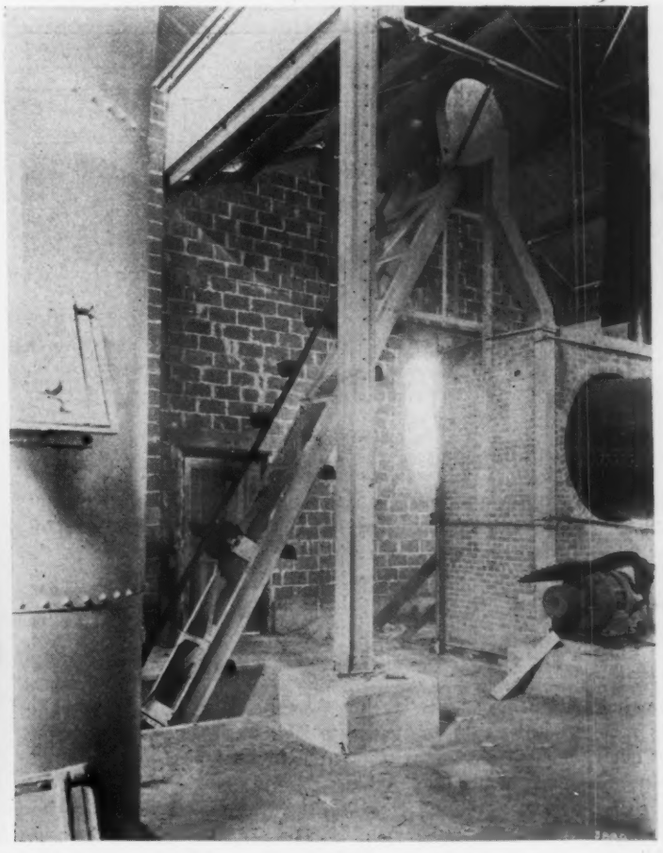
Interior of Schaffer hydrator



Looking over the tops of the concrete silos—Cyclone dust collectors and screw conveyor for returning dust to the bins

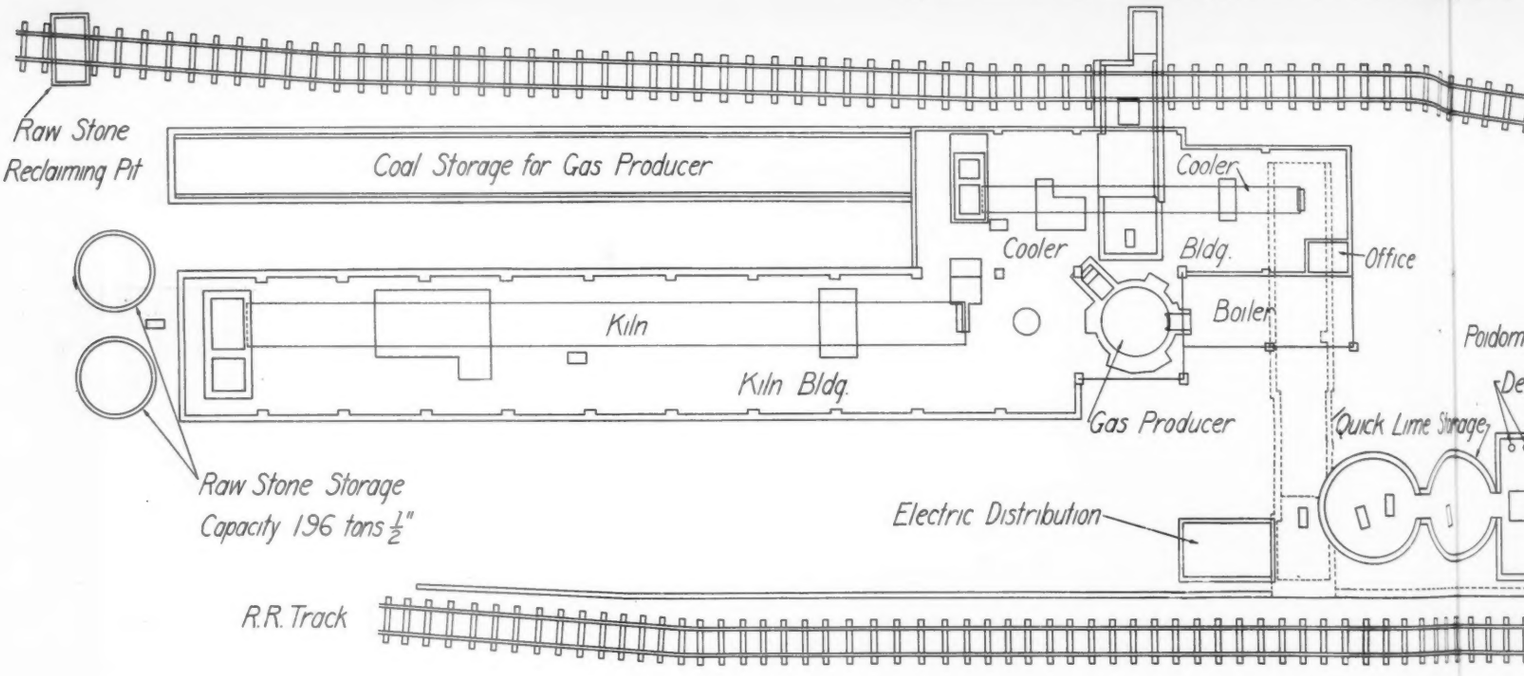
is the practice in so many modern plants with both shaft and rotary kilns. The steam is made in a Houston, Stanwood and Gamble boiler and is first used to drive a turbo-blower, which furnishes the air for the gas producer. The exhaust steam from the blower passes into the discharge pipe of the blower and goes with the air into the producer. This mixture passes through a central pipe underneath the producer and impinges on two baffles, which spread the mixed air and steam before sending it up through the

Back of plant showing coal-handling elevator and coal bin above the gas producer



Elevator taking lime from cooler to the bin feeding the Schaffer hydrator

A panorama of the new lime plant of the Marble Cliff Quarries



Plan of the plant of the Marble Cliff Quarries Co. showing the straight-line sch

burning coal. A live steam connection, attached to a "steam head" on the pipe that carries the air and exhaust steam to the producer, so that steam may be taken directly from the boilers, is provided. The plant superintendent says that it is his intention to pay especial attention to the use of steam in connection with producer gas in rotary kiln firing. The matter is one that needs more investigation than it has received hitherto, as figures are lacking even for such elementary facts as the proportion of coal used in making steam as compared with the coal used in the gas producer.

The gas is supposed to leave the producer at a temperature of 1300 F. and to contain 140 B. t. u.'s per cubic foot at atmospheric pressure. The flame passes the entire length of the kiln and into the dust chamber at the end.

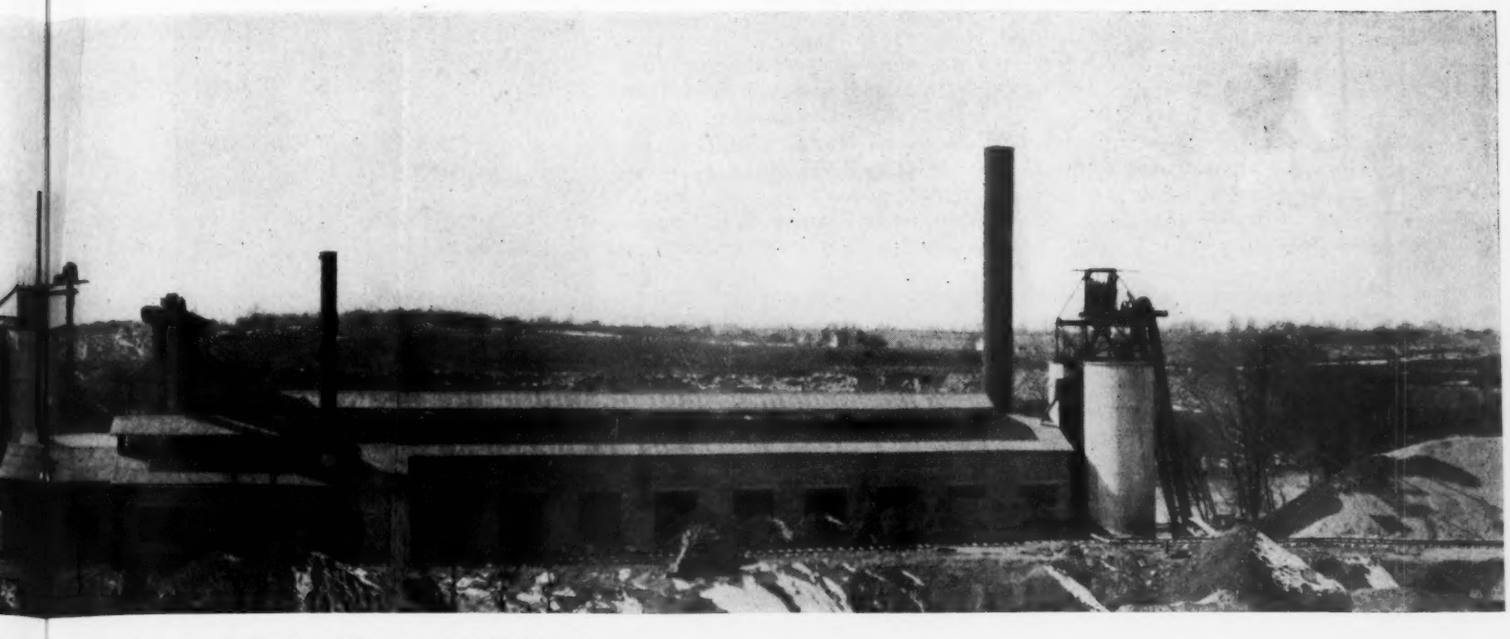
Color Flame Guide to Correct Temperature

The color of the flame is a guide to the proper amount of steam to be used. With the right amount of steam it "softens," or loses some of its brilliancy and becomes of an orange color. It is the softened flame that, for some reason connected with the chemistry of combustion, gives the highest grade of lime.

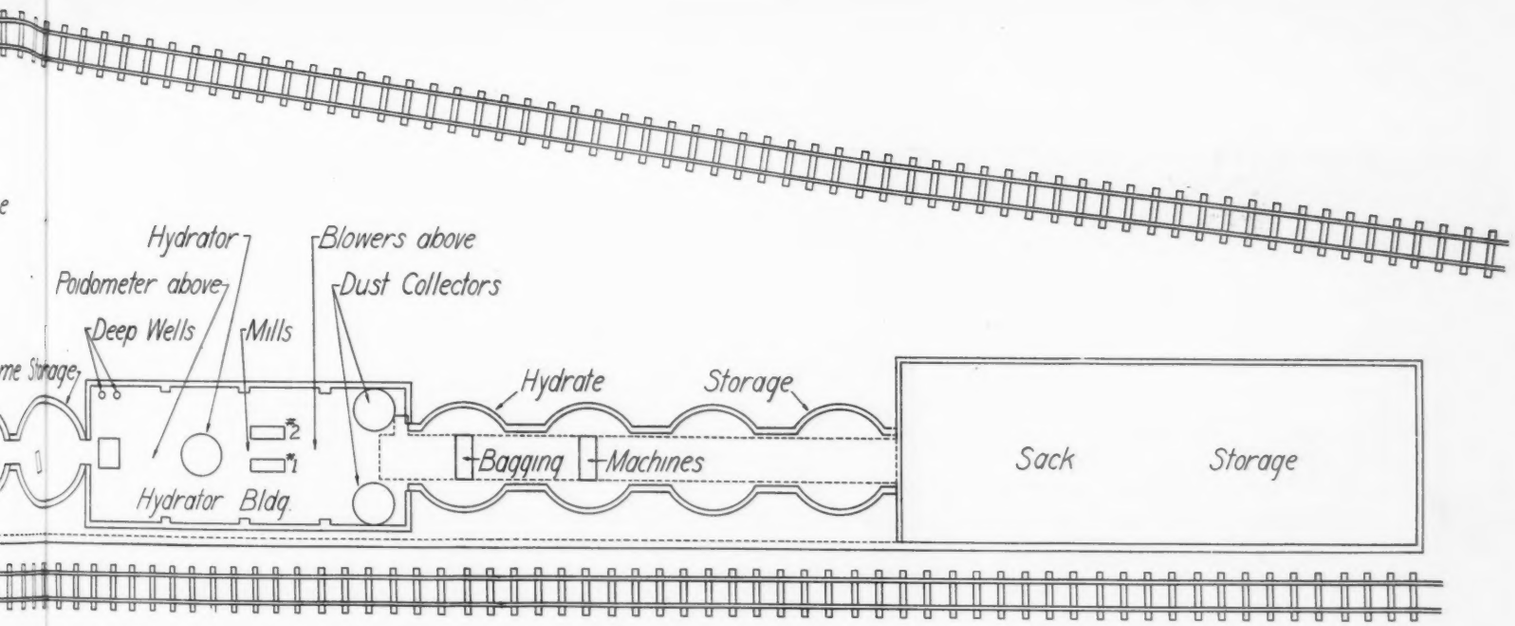
The gas producer has a heavy outside shell on the lower part of which is a gear turned by a pinion, so that the whole shell is rotated. Two stirring bars, or pokers, arranged so that the circular paths in which they travel intercept, are driven by gears on top of the producer. The effect of the three motions is such that every part of the bed of coal is turned and worked over continually, insuring an even flow of air through every part of the bed and a uniform quality of gas. The producer is 9 ft. in diameter inside the firebrick lining.

The gas flows from the producer to the kiln through a steel pipe lined with firebrick and 4 ft. in diameter.

The burned lime falls into a pit at the end of the kiln, from which it is lifted



e Cliff Quarries Co. near Columbus, Ohio—a straight-line plant



traight-line scheme of flow sheet—The plan is reversed from the panorama above

by a "hot" elevator so that it falls by gravity into the rotary cooler which is set parallel with the kiln. The cooler is 60 ft. long and 5 ft. in diameter and is of the same make as the kiln. After passing the cooler the burned lime is elevated to the burned lime bins from which the hydrating plant is fed.

There are two of these bins, each of which has a hopper bottom to which is attached a 9x12-in. enclosed screw conveyor. These conveyors feed into a 12-in. screw conveyor which in turn feeds the elevator that delivers the lime to the Schaffer poidometer by which the feed to the hydrators is weighed. The poidometer controls the motors that drive the feed screws under the lime bins, stopping and starting and regulating the flow of lime.

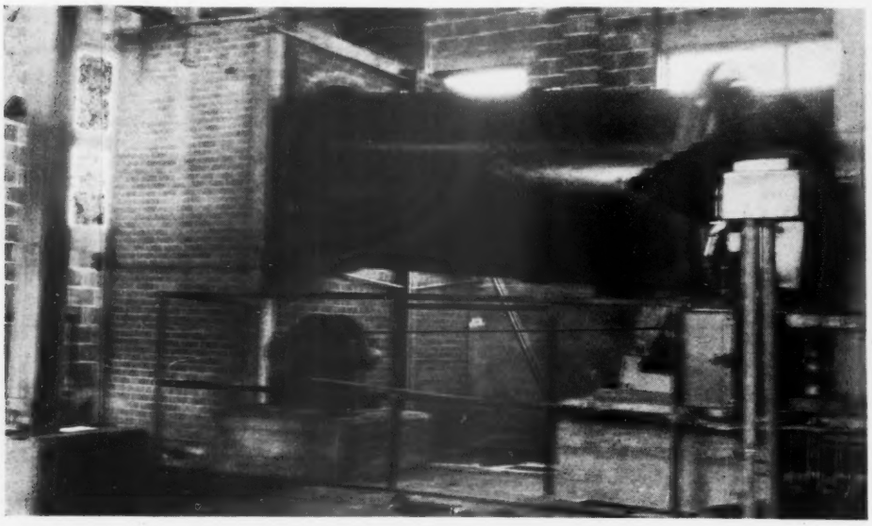
The Schaffer hydrator is circular in section and has six disks, three revolving and three stationary. The flow of the material is down through the center of one disk and over the edge of the next, the flow being maintained by means of plows attached to the disks. The steam resulting from the hydration is brought down to the lowest part of the hydrator and sent out through the breechings. A cooking action takes place by holding a pressure in the top disks.

The hydrated lime falls into the Raymond pulverizing mills, which are not of the roller type used for grinding. These mills have a horizontal shaft fitted with beater blades that pulverize and break up lumps of hydrated lime and free the lime from any dirt or foreign matter that may be present. From these mills the lime is blown through pipes to the regular Raymond air separating system, with 7-ft. and 4½-ft. cyclones. Any dirt and unburned lime goes back to be discharged at a door in the mills. The pure hydrated lime is sent to either of two bins of the silo type from which it is drawn by Bates valve-bag packers. There are four of these silos but only two will be used at present, the others being kept for reserve storage. The sacked lime is carried by a belt conveyor to a storage house beyond the silos.

The entire plant is splendidly built of steel and concrete blocks. All floors are of concrete. In the floor of the hydrating plants screens are placed above a conveyor which takes the sweepings to the air separating system, where the dirt is removed and the clean lime recovered.

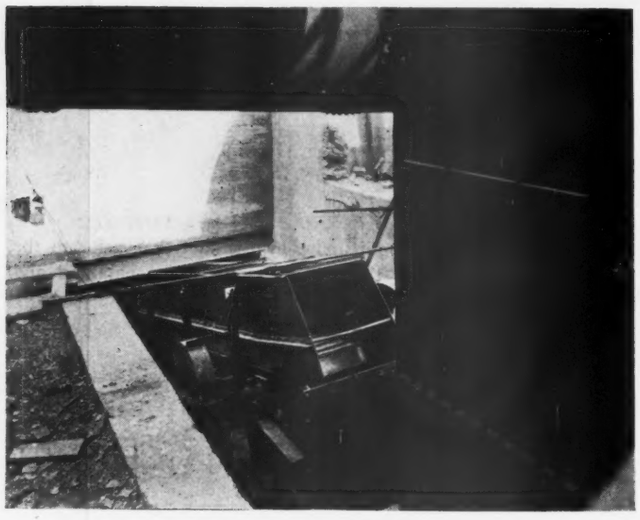
The design of the plant is mainly due to R. H. Pausch, of the Marble Cliff Quarries Co., and John C. Schaffer of the Schaffer Engineering and Equipment Co. L. H. Eberhart, who is in charge, had been with the Schaffer company for seven years and only recently resigned to accept the position of superintendent of the new plant.

The officers of Marble Cliff Quarries Co. are: president, W. H. Hoagland; vice-president and general manager, H. J. Kaufman; secretary-treasurer, R. H. Pausch. H. R. Welsh is general superintendent.

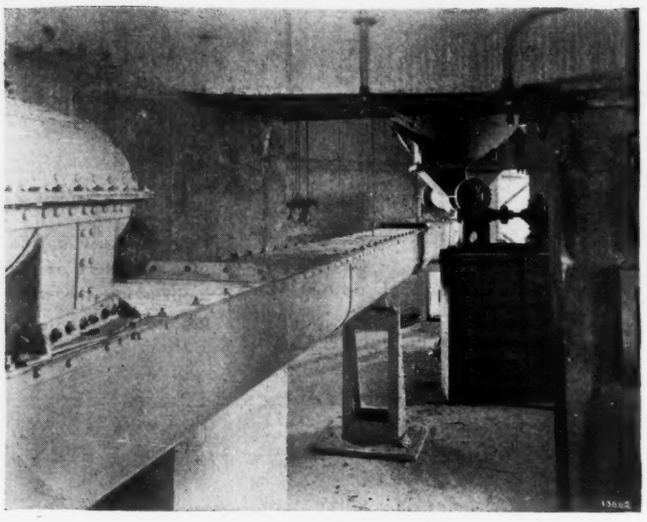


Receiving end of the rotary cooler

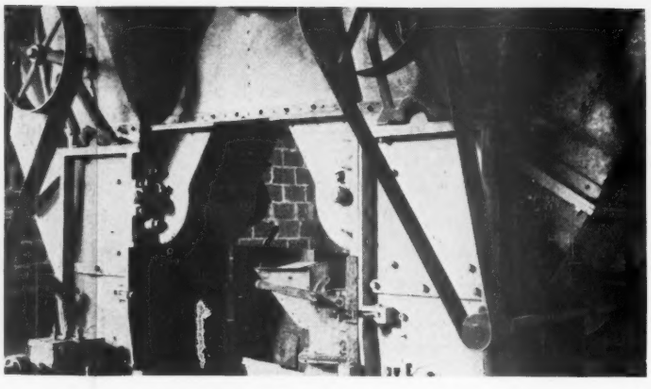
Bag dust collectors for extra fine lime hydrate



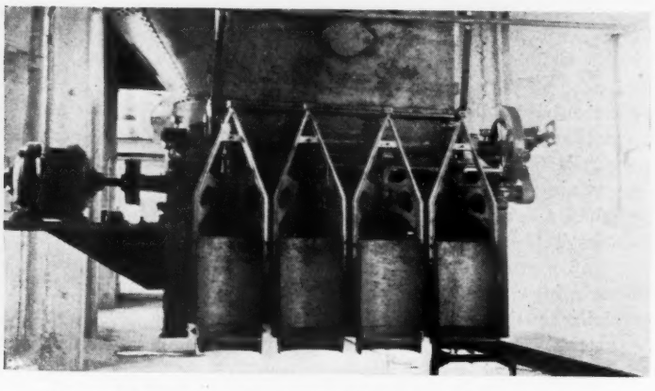
Feed end of elevator for coal to gas producer



Screw conveyors under lime bins feeding the poidometer



Raymond mills—one at the left with door open



Bates valve-bag packers attached direct to bottoms of hydrate silos

Portland Cement Association Staff Changes

C. D. FRANKS, who, since June, 1916, has been district engineer in charge of the association's Indianapolis office, is appointed assistant general manager in administrative charge of association work in the districts covered by the Minneapolis, Milwaukee, Des Moines, Chicago, St. Louis and Indianapolis offices. Until June 1, 1924, Mr. Frank's headquarters will be the Merchants Bank building, Indianapolis. After that date his headquarters will be 111 West Washington street, Chicago.

L. C. Miller succeeds Mr. Franks as district engineer in charge of the Indianapolis office. Since February, 1917, Mr. Miller has been association field engineer in Indiana and during his work in that capacity has acquired a large acquaintanceship in the district of which he now takes charge. The Indianapolis office of the association, located in the Merchants Bank building, is in charge of the association work in Indiana and Kentucky.

A new association office is open in Charlotte, N. C. John E. Tate, heretofore district engineer in charge of the New Orleans office and previously association field engineer in North Carolina, is appointed district engineer in charge. Until July 1 this office will be located in the Piedmont building. After that date the permanent address will be the Johnston building. The Charlotte office will be in charge of association work in North Carolina.

Portland Cement Association Opens Oklahoma Office

THE Portland Cement Association announces the opening of a district office in the First National Bank building, Oklahoma City, Okla., effective March 1, with B. E. Clark as district engineer. The Oklahoma City office will be in responsible charge of Portland Cement Association work in Oklahoma.

Forest Kaufman, who for more than six years has been district engineer in charge of the Kansas City office of the Portland Cement Association, is made district manager of the Kansas City and Oklahoma districts. The Kansas City district comprises Nebraska, Kansas, and western Missouri.

Mr. Clark is a civil engineering graduate of Washington and Lee University, Virginia. During the period 1906 to 1920, inclusive, Mr. Clark served in various railway and mining engineering capacities in Kentucky, Mexico and Oklahoma. In 1920 he was appointed division engineer in charge of the eastern district of the Oklahoma state highway department and in February, 1921, was made state highway engineer, serving in that capacity until May, 1921, when he was appointed state highway commissioner.

C. S. Huntington Extends His Field to Cement Industry

C. S. HUNTINGTON, who is sales engineer for Link-Belt in its sand and gravel washing division, has been appointed to look after the Link-Belt interests in the cement industry, while he continues to have charge of the sand and gravel work.

There are few sales engineers for manufacturing companies who have rendered such a service to an industry as Mr. Huntington has to sand and gravel. He has not

C. S. Huntington

only designed many plants, among which are some of the best in the country, but he has given useful and constructive service to other builders of plants. And he has aided in bringing the whole industry on a higher plane.

He will make his headquarters in Chicago as usual and look after the cement business through the offices of the Western division.

Howard McNeal, who has been transferred from the Philadelphia to the Chicago offices of the Link-Belt Co., will do engineering work in the sale of loaders, portable conveyors and electric hoists.

Rock Products in the Diet!

WE knew it! Refer to your ROCK PRODUCTS, December 15, 1923, p. 26. Here's the proof!

EATS PLASTER PARIS CAKES

CORNING MAN SURVIVES REPAST WITHOUT ILL EFFECTS

CORNING, N. Y., March 14.—Plaster of paris pancakes was the menu which Samuel L. Smith, prominent Corning contractor, had for breaktast a day or two ago, and despite the fact that he ate four, he suffered no ill effects.

Mrs. Smith, in mixing the batter, dipped into a bag left in the flour by paperhangers recently, and the mistake was not discovered until Mrs. Smith's daughter noticed the peculiar taste. By this time Mr. Smith had devoured four. He went to a physician as a precautionary measure, but has not yet been bothered by his unusual meal.—New York Times.

Canadian Cement Output Still Below Pre-War Days

THE annual statement of the Canada Cement Co. Ltd., Montreal, shows a total of assets of $35,563,907.40. Investments amount to $5,626,432.43, current assets to $3,716,336.40, deferred charges to operations $52,120.00 and the balance to lands, buildings, plant and equipment. The liabilities include stock amounting to $30,000,000 of which $24,000,000 has been issued; reserves insurance, etc., $3,726,488.49. The surplus at December 31, 1923 is $653,158.61. In a statement President Frank P. Jones says:

"The volume of business for 1923 showed a slight improvement over 1922, but Canada's consumption of cement is still 20% less than in 1913 and was in 1923 only about 48% of the producing capacity of the Canadian mills. The demand since 1921 has shown a slight increase and we hope it will continue to increase, but this depends on the growth and prosperity of Canada and undoubtedly the present producing capacity will be sufficient for many years to come.

"The cement producing capacity of Canada and her present consumption by districts, are as follows:

	Present Producing Capacity in Bbls.	Present Consumption in Bbls.	Percentage of Producing Capacity in Excess of Consumption
British Columbia....	1,650,000	503,000	223
Alberta, Saskatchewan, Manitoba....	2,800,000	517,000	442
Ontario	5,120,000	3,708,000	33
Quebec, N. Brunswick, Nova Scotia, P. E. Island..	5,060,000	2,360,000	124
	14,630,000	.....	106

"The situation shown by these figures was brought about by the fact that prior to the war the existing mills were enlarged and new ones were built as it was believed the increasing demand for cement would continue. Instead there has been a decrease in demand with the result that Canada now has a producing capacity more than 100% in excess of her requiring.

"We have adopted a policy of replacing the production of the older and less economical mills by building new ones and enlarging the capacity of the existing economical mills and installing labor saving machinery. The result is that our mills are up-to-date, efficient and economical and are ready to meet any competition that may arise.

"In December 1921 we purchased a site at Hanelock, N. B., suitable for manufacturing cement but nothing further has been done with the property.

"Export business has been maintained but it does not appear that this can be increased to any considerable volume on account of freight rates from Canada to the markets of the world being much higher in most cases than the rates from Europe to the same market."

Colorado Brings Suit Against Companies for Violating Compensation Act

THE Denver, Colo., *News* speaks of a rather unusual suit brought by the state of Colorado against a rock products company and a mining company. The paper's account is as follows:

"In the four suits brought against two corporations in district court the Industrial Commission of Colorado seeks to collect penalties totaling approximately $45,000. The defendant companies, it is alleged, failed to comply with workmen's compensation awards made by the commission. Three of the complaints are filed against the Turkey Creek Stone, Clay and Gypsum Co., the fourth being against the Blue Flag Silverton Gold Mining Co.

"Employes of the firms were injured, it is declared, in the months of May and June, 1923, and were awarded compensation by the commission under the workmen's compensation act. The employers refused to pay this compensation, it is stated.

"The commission asks penalties of $100 a day for each day the awards remained unpaid."

Canadian Plant Making Alunite Fertilizer

THE Alunite Chemical Corp., Ltd., operating alunite deposits on the west coast of Vancouver Island, is reported to have received an order from Australia for 30,000 tons of alunite fertilizer. The plant is being operated to turn out 100 tons per day.

Atlas Cement Co. Buys Land Near Davenport, Iowa

PURCHASE of 83 acres of land in Pleasant Valley township, Iowa, located opposite Campbell's island, for $53,729, originally negotiated for by the Western States Portland Cement Co., now the property of the Atlas Cement Co., of Independence, Kan., was completed recently.

The Western States Portland Cement Co. negotiated for the purchase of the land in 1921 when other land holdings in the vicinity were also purchased. About a year ago the plant was purchased by the Atlas company and much of the material and equipment which had never been used, has been dismantled and moved.—*Davenport, Iowa, Times.*

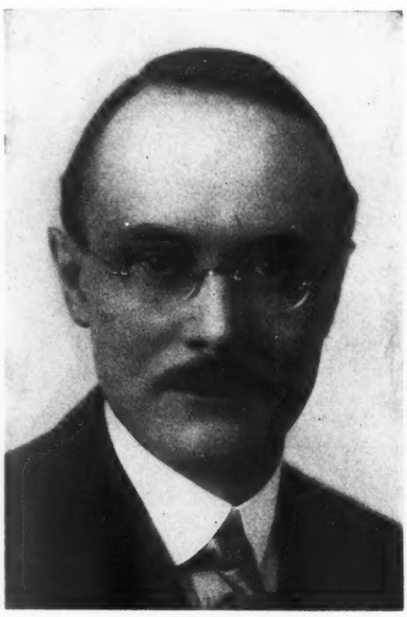
South Dakota Producers Form Aggregate Association

ACCORDING to the Sioux Falls *Argus* the producers of sand, gravel and crushed stone between Watertown and Sioux Falls, S. D., met at Sioux Falls recently and formed an association of aggregate producers.

Paul C. Van Zandt with Cement Securities Co.

PAUL C. VAN ZANDT, who will be remembered by ROCK PRODUCTS readers in connection with the building and operation of cement plants in the Orient, has returned to America and accepted the position of chief engineer of the Cement Securities Co., with headquarters at Denver, Colo. The company has seven plants and Mr. Van Zandt will look after all of them.

Mr. Van Zandt left Japan some time before the Tokio earthquake, returning to America by the Suez canal and Europe. He writes: "No one knows better than I do how fortunate I was to leave Japan at the time I did. The beautiful house by the sea, in which I lived while in Yokohama, came down in the earthquake of September 1 last year and all the occupants were killed."



Paul Van Zandt

Patent Decision Opens New Use for Green Sand, or Glanconite

ROCK PRODUCTS has published a number of articles on the green sand, or glanconite, deposits of New Jersey and other eatsern states. They have been of chief interest as a source of potash. By a recent patent decision, however, they can now be used in the manufacture of a water softener in competition with a well-known commodity. The *Chemical Bulletin* of January, 1924, gives the following facts in regard to the decision:

Another round in the zeolite fight ended November 9 at Detroit, Mich. On that day Judge Tuttle of the U. S. District Court for Eastern Michigan ruled that the Gans' patent, U. S. 1,195,923, which if held valid would give the Permutit Co. practical control of zeolitic water softening in this country, is void.

The decision will be of interest to the many chemists throughout the country who have followed the complex and hard-fought struggle being waged between the Permutit Co. and other concerns in the zeolite field. The decision will be of special interest to many of us since it affects George Borrowman, whose U. S. licensee, the Wayne Tank & Pump Co. was the defendant.

The case was of long standing. In 1918 the Borromite Co. of America was Borrowman's U. S. licensee. The Massachusetts Laundry Co. of Detroit, one of its customers, was sued by the Permutit Co. for alleged infringement of the Gans' patent. The Borromite Co. of America, a Chicago company, through its protection of its customers, became co-defendant. In January, 1921, the Wayne Tank & Pump Co., large manufacturers of Ft. Wayne, Ind., bought the entire business of the Borromite Co. and thus became defendant in this suit.

Zeolite water softening filters are constructed and operated like ordinary sand filters, the filter bed consisting of granular zeolite or base exchange silicate. These mineral substances are usually hydrated silicates of aluminum and sodium.

The zeolite originally manufactured by the Permutit Co. was a synthetic product developed in Germany and known as Permutit. The material made by the Borromite Co. of America and its predecessor, the Cartwright-Capps Co., was known as Borromite. It is now called Wayne Mineral. It is prepared from the mineral known as green sand or glauconite. George Borrowman is responsible for the use of this material in water softening, and has secured patents on it in the United States and foreign countries.

The invalidated Gans' patent is a very broad one covering the softening of water with any base exchange silicate. It does not concern the use of any particular base exchange substance. If it could be sustained it would give the Permutit Co. a monopoly of this method of water softening.

New Gravel Plant on Scioto River

THE latest addition to the sand and gravel producing industry of Columbus is the plant of the Greenlawn Gravel Co., located on the west bank of the Scioto River just south of Greenlawn Ave. bridge.

Herbert R. Gill who is president of the Island Sand and Gravel Co. off the foot of W. Moler St. is also president of the Greenlawn Gravel Co. He is a pioneer in, and an authority on, sand and gravel production.

The Columbus Consumers Supply Co. of 315 N. Forth St. will operate both the Island and the Greenlawn plants.—*Columbus, Ohio, Citizen.*

Prices of Indiana Crushed Stone

CONTRACTS for stone were let at a meeting of the county board of commissioners at Hartford, Ind., recently. The Midwest Quarries Co. and the Erie Stone Co. were the successful bidders. Ethan Secrest was also a bidder. The Midwest company was granted contracts as follows: Dunkirk, $1.53; Millgrove $1.53; Hartford City $1.53; Renner $1.66. The Erie Stone Co. was granted the following contracts: Montpelier, $1.63, and Mollie, $1.63. All prices are quoted f.o.b. plant.

Editorial Comment

Beauty in Aggregates

The dull gray monotony of a concrete structure is sometimes unpleasing, and unless it can be relieved the public will often choose other materials for purely aesthetic reasons. Of course the concrete may be covered with brick or tile, but this adds to the weight as well as to the expense. Two methods of making concrete more beautiful were shown at the recent Institute meeting. One of these was by the use of a preparation which, applied to the forms, destroyed the skin coat, so that the aggregate could be exposed by rubbing with a wire brush. This will interest aggregate producers, as it is possible that aggregate for certain structures may be chosen for its beauty as well as for its strength. The other method was the use of color.

Wasting Public Appropriations

At the recent annual conventions of the National Crushed Stone Association and the National Sand and Gravel Association a considerable amount of time was devoted to discussion of the waste of energy and money in attempts of public highway officials and contractors to produce their own aggregates in competition with the commercial articles. Recognizing, of course, that there are exceptions to all rules, it seems pretty well established that it is a waste of money to attempt to duplicate existing facilities for production with plants of a temporary character; and that taking into account quality and service, it is seldom justifiable.

The Associated General Contractors of America, in annual convention at Chicago, were at the same time debating ways and means of eliminating the construction of public works by the day-labor method. Comparing the cases of the two industries—or the two branches of the same industry—it would seem there is much in common, and that many arguments advanced by the contractors can be used by mineral aggregate producers against the use of local aggregates produced by the contractors themselves with equal force.

The arguments of the contractors are summarized in the following resolution adopted by their convention:

WHEREAS, there is manifest throughout the country a tendency among public officials to do public construction by the day labor method, and

WHEREAS, this method of expending public funds is generally recognized as being economically unsound as a general practice, in that it provides no foundation of responsibility and offers no assurance that such work will be of proper quality and performed for the amount of money voted or appropriated therefore, and

WHEREAS, our construction history is full of notorious instances of the excessive cost of this construction method, and of its encouragement to inefficiency, incompetence and sinister political influence, and of a strong tendency towards socialism; and

WHEREAS, the constructors are especially fitted to interpret to the public this menace, and also lay upon us the responsibility of so doing; now therefore.

BE IT RESOLVED, that the Associated General Contractors urges its membership throughout the country to accept as a major duty a campaign of publicity to show the results of the day labor method of doing public construction and to enter upon a vigorous and persistent effort to secure legislation which will require public bodies to do public construction by the sound method of firm contracts guaranteeing completion at a fixed price.

How One State Buys Cheap Sand

Considerable publicity in both local newspapers and national engineering journals has been given to a contract by a mid-west state highway department for sand at 20 cents per ton. But the facts of the case *have not been published.*

From excellent authority it has been learned that the reason this state highway department has been able to buy this sand at 20 cents a ton, while regular producers have to charge much more, is that the sand is produced as a by-product of a dredging operation primarily undertaken for the building of a levee. The sand is not delivered on cars but merely piled on the bank. It must be passed through a screening plant or washing plant to remove gravel and trash and a royalty must be paid the state through which the river flows. Finally, a side track will have to be constructed to load the sand and a differential of 39 cents a ton freight will have to be paid, figuring an average on 29 different points ordinarily supplied with sand from this river.

In the light of these facts it does not seem that the state highway commission can buy its sand as cheaply in this way as it could get it from the regular producers. The initial cost of 20 cents a ton will barely cover the operating cost of dredging without washing, screening or loading on the cars, and without figuring in the overhead, selling expense, depreciation, taxes and insurance and the other things that the regular producer must be paid for or go out of business. When the state has paid washing, loading and overhead expenses and amortized the expense of plant construction and track laying it will do well if it gets its "20 cent sand" for $1.20. But the taxpayers of the state will probably remain in blissful ignorance of the fact that the sand has cost almost twice what it could have been bought for in the open market.

Example of Research

Can research work of commercial value be done on such materials as sand and gravel and crushed stone? Who can say no? Diatomaceous earth is earth—dirt. Once it was a curiosity. Today it is a world necessity. Once all commercial stone was cut stone; today cut stone is a minor factor in the stone industry. What will tomorrow bring forth as to the possibilities of even so common a material as sand or stone?

The Rock Products Market

Wholesale Prices of Crushed Stone

Prices given are per ton, F. O. B., at producing plant or nearest shipping point

Crushed Limestone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:						
Blakeslee, N. Y.	1.00	1.40	1.40	1.30	1.30	.....
Buffalo, N. Y.			1.50 per net ton all sizes			
Chaumont, N. Y.	1.00	.....	1.75	1.50	1.50	1.50
Cobleskill, N. Y.	1.25	1.25	1.25	1.25	1.25	.....
Coldwater, N. Y.			1.50 per net ton, all sizes			
Eastern Pennsylvania	1.35	1.35	1.45	1.35	1.35	1.35
Prospect, N. Y.	.80	1.40	1.40	1.30	1.30	.....
Watertown, N. Y.	.50	.....	1.75	1.50	1.50	1.50
Western New York	.85	1.25	1.25	1.25	1.25	1.25
CENTRAL:						
Alton, Ill.	1.75	.....	1.75	1.50	.....	.....
Buffalo, Iowa	1.00	.....	1.45	1.25	1.30	1.30
Cypress, Ill.	1.20	1.35	1.35	1.20	1.20	1.10
Dundas, Ont.	.75	1.10	1.10	1.10	.95	.95
Gary, Ill.	1.10	1.40	1.10	1.10	1.10	1.10
Greencastle, Ind.	1.25	1.25	1.15	1.05	1.05	1.05
Lannon, Wis.	.80	1.10	1.10	1.00	1.00	1.00
St. Vincent de Paul, P. Q.	.85	1.20@1.45	1.15	1.05	.95	.95
Sheboygan, Wis.	.90	.....	1.10	1.00	.....	.....
Stone City, Iowa	.75	.....	1.50†	1.40	1.30	.....
Toledo, Ohio	1.60	1.70	1.70	1.60	1.60	1.60
Toronto, Canada	1.90‡	2.25‡	2.25‡	2.25‡	2.00‡	2.00‡
Walford, Pa.	.....	.....	1.30	1.45	1.55	1.55
Waukesha, Wis.	1.15	1.15	1.15	1.15	1.15	1.15
SOUTHERN:						
Alderson, W. Va.	.60	1.75	1.75	1.50	1.40	.....
Bridgeport and Chico, Texas	1.00	1.35	1.35	1.35	1.25	1.20
Cartersville, Ga.	1.75	1.50	1.50	1.15	1.15	1.10
El Paso, Texas	1.00	1.00	1.00	1.00	.....	.....
Ft. Springs, W. Va.	.60	1.70	1.70	1.60	1.50	.....
Garnet and Tulsa, Okla.	.50	1.60	1.60	1.45	1.45	.....
Graysville, Ga.	1.00@1.25	.80@1.00	.....	.75@1.00	.75@1.00	.....
Rock Crusher, Ky.	1.50	1.25	1.25	1.25	1.25	1.15
WESTERN:						
Blue Spr'gs and Wymore, Neb.	.20	1.45	1.45	1.35@1.40	1.25@1.30	1.20
Cape Girardeau, Mo.	1.35	.....	1.25	1.25	1.00	.....
Kansas City, Mo.	1.00	1.65	1.65	1.65	1.65	1.65

Crushed Trap Rock

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Branford, Conn.	.60	1.60	1.35	1.15	1.00	.....
Duluth, Minn.	.90@1.00	2.25	1.90@2.00	1.40@1.50	1.35@1.40	1.35@1.40
El Cerrito, Calif.	1.75	1.75	1.75	1.75	1.75	1.75
E. Summit, N. J.	2.00	.....	.....	1.80	.....	.....
Eastern Massachusetts	.85	1.75	1.75	1.40	1.40	1.40
Eastern New York	.75	1.50	1.50	1.30	1.40	1.30
Eastern Pennsylvania	1.25	1.55	1.50	1.40	1.40	1.40
Meriden, Middlefield, New Britain, Rocky Hill, Conn.	.60	1.60	1.35	1.15	1.00@1.10	1.00
Oakland, Calif.	1.00	1.00	1.00	.90	.90	.....
Richmond, Calif.	.50*	.....	1.65*	1.50*	1.50*	.....
San Diego, Calif.	.50@.75	1.80@1.90	1.60@1.80	1.35@1.55	1.35@1.55	1.25@1.45
Springfield, N. J.	1.80	2.00	2.00	1.75	1.60	1.60
Westfield, Mass.	.60	1.50	1.35	1.20	1.10	.....

Miscellaneous Crushed Stone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Berlin, Utley and Red Granite, Wis.	1.60	1.70	1.60	1.50	1.40	.....
Columbia, S. C.	.50	.....	2.00	.....	1.60	.....
Eastern Penna.—Sandstone	1.25	1.55	1.45	1.25	1.25	1.25
Eastern Penna.—Quartzite	1.20	1.35	1.20	1.20	1.20	1.20
Lithonia, Ga.	.75	2.00	2.00	1.35	1.35	1.25
Middlebrook, Mo.—Granite	3.00@3.50	.....	2.00@2.25	2.00@2.25	.....	1.25@2.00
Sioux Falls, S. D.—Granite	1.00	1.60	1.55	.....	1.50	.....

*Cubic yd. †1 in. and less. ‡Prices include 90c freight.

Agricultural Limestone

(Pulverized)

Cassadaga, N. Y.—Marl, 50 lb. hemp bags	7.00@ 9.00
Chaumont, N. Y.—Analysis, 95% $CaCO_3$, 1.14% $MgCO_3$—Thru 100 mesh; sacks, 4.50; bulk	3.00
Branchton, Pa.—100% thru 20 mesh; 80% thru 50 mesh; 60% thru 100 mesh (Four Leaf Clover Brand); sacks, 5.00; bulk	3.50
Hillsville, Pa.—Analysis, 94% $CaCO_3$, 1.40% $MgCO_3$, 75% thru 100 mesh; 94% thru 50 mesh; sacks, 5.00; bulk	3.50
Jamesville, N. Y.—Analysis, 89.25% $CaCO_3$; 5.25% $MgCO_3$; pulverized, bags, 4.00; bulk	2.50
Watertown, N. Y.—Analysis 96-99% $CaCO_3$; 0.02% $MgCO_3$—90% thru 100 mesh, bags, 4.50; bulk	3.00
New Castle, Pa.—94% $CaCO_3$, 1.40% $MgCO_3$—75% thru 100 mesh, 94% thru 50 mesh; sacks, 5.00; bulk	3.50
West Stockbridge, Rockdale, Mass., North Pownal, Vt.—Analysis, 90% $CaCO_3$—50% thru 100 mesh; paper bags, 4.75; cloth, 5.25; bulk	3.25
Alton, Ill.—Analysis, 98% $CaCO_3$, 0.5% $MgCO_3$; 90% thru 100 mesh	6.00
Belleville, Ont.—Analysis, 90.9% $CaCO_3$, 1.15% $MgCO_3$—45% to 50% thru 100 mesh, 61% to 70% thru 50 mesh; bulk	2.50
Cypress, Ill.—Analysis, 96.12% $CaCO_3$, 2.5% $MgCO_3$; 50% thru 50 mesh	1.25
Marblehead, Ohio—Analysis, 83.54% $CaCO_3$, 14.92% $MgCO_3$; 60% thru 100 mesh; 80-lb p. sacks 5.00; bulk	3.50
Piqua, Ohio—Total neutralizing power 95.3%; 100% thru 10, 60% thru 50; 50% thru 100	2.10@ 2.25
100% thru 10, 90% thru 50, 80% thru 100; bags, 5.00; bulk	3.50
100% thru 100, 85% thru 200; bags, 7.00; bulk	5.50
Waukesha, Wis.—Analysis, neutralizing equivalent 107.38% $CaCO_3$; 99% thru 10 mesh, 55% thru 60 mesh; bulk	2.35
200-mesh bags ex., returnable	4.50
Hot Springs, N. C.—50% thru 100 mesh; sacks, 4.25; bulk	2.70
Knoxville, Tenn.—80% thru 100 mesh, bags, 3.95; bulk	2.70
80% through 200 mesh, bags 4.75; bulk	3.50
Linville Falls, N. C.—Analysis, 57% $CaCO_3$, 39% $MgCO_3$; 50% thru 100 mesh; 200 lb. burlap bag, 4.00; bulk	2.75
Mountville, Va.—Analysis, 76.60% $CaCO_3$, 22.83% $MgCO_3$—50% thru 100 mesh; 100% thru 20 mesh; sacks	5.00
Colton Calif.—Analysis, 95% $CaCO_3$, 3% $MgCO_3$—all thru 20 mesh—bulk	4.00
Lemon Cove, Calif.—Analysis, 94.8% $CaCO_3$, 0.42% $MgCO_3$; 60% thru 200 mesh; sacks, 5.25; bulk	4.50
Dundas, Ont.—Analysis, 53.80% $CaCO_3$, 43.31% $MgCO_3$—35% thru 100 mesh; 50% thru 50 mesh; 100% thru 10 mesh; bagged, 4.75; bulk	3.00

Agricultural Limestone

(Crushed)

Bellevue, Ohio—Analysis, 61.56% $CaCO_3$, 36.24% $MgCO_3$; ¼ in. to dust, about 20% thru 100 mesh	1.25
Bettendorf, Iowa, and Moline, Ill.—97% $CaCO_3$, 2% $MgCO_3$; 50% thru 100 mesh; 50% thru 4 mesh	1.50
Buffalo, Iowa—90% thru 4 mesh	1.00
Cape Girardeau, Mo.—Analysis, 93% $CaCO_3$, 3.5% $MgCO_3$; 90% thru 50 mesh	1.50
Cartersville, Ga.—Analysis, 60% $CaCO_3$; 36% $MgCO_3$—all passing thru 10 mesh	1.50@ 1.75
Carthage, Mo.—Analysis, 98½% $CaCO_3$; 100% thru 10 mesh, 30% thru 100 mesh	1.75
Elmhurst, Ill.—Analysis, 35.73% $CaCO_3$, 20.69% $MgCO_3$; 50% thru 50 mesh	1.25
Gary, Ill.—Analysis, 60% $CaCO_3$, 40% $MgCO_3$; 90% thru 100 mesh	1.10
Huntington and Bluffton, Ind.—Analysis, 61.56% $CaCO_3$, 36.24% $MgCO_3$; about 20% thru 100 mesh	1.25

(Continued on next page)

Agricultural Limestone

(Continued from preceding page)

Greencastle, Indiana.—Analysis, 98% $CaCO_3$; 50% thru 50 mesh	**2.00**
Kansas City, Mo.—50% thru 100 mesh	**1.25**
Krause and Columbia, Ill.—Analysis, 90% $CaCO_3$, 90% thru 4 mesh	**1.20**
Lannon, Wis.—Analysis, 54% $CaCO_3$, 44% $MgCO_3$; 99% through 10 mesh; 46% through 60 mesh	2.00
Screenings (¼ in. to dust)	1.00
Marblehead, Ohio.—Analysis, 83.54% $CaCO_3$, 14.92% $MgCO_3$; 100% thru 4 mesh; 83% thru 10 mesh; bulk	1.25
Milltown, Ind. — Analysis, 91.95% $CaCO_3$, 4.87% $MgCO_3$; 36% thru 100 mesh, 43.2% thru 50 mesh	1.45@ 1.60
Monroe, Mich.—Analysis, 51.91% $CaCO_3$, 44.17% $MgCO_3$; agricultural limestone meal, 3/16 in. to dust, 30% thru 100 mesh	1.60
Ohio (different points), 20% thru 100 mesh; bulk	**1.25@ 1.50**
Piqua, Ohio—100% thru 4 mesh	1.25
River Rouge, Mich.—Analysis, 54% $CaCO_3$, 40% $MgCO_3$; bulk	**.80@ 1.40**
Stolle, Ill., near East St. Louis on I. C. R. R.—Thru ¼-in. mesh	**1.30**
Stone City, Iowa. — Analysis, 98% $CaCO_3$; 50% thru 50 mesh	**.75**
Waukesha, Wis.—No. 1 kiln dried	**2.00**
No. 2 Natural	**1.75**
Alderson, W. Va. — Analysis, 90% $CaCO_3$; 90% thru 50 mesh	1.50
Claremont, Va.—Analysis, 92% $CaCO_3$, 2% $MgCO_3$; 90% thru 50 mesh	**3.00**
50% thru 50 mesh, 90% thru 4 mesh, 50% thru 4 mesh	**2.75**
Ft. Springs, W. Va.—Analysis, 90% $CaCO_3$; 50% thru 100 mesh	**1.50**
Garnett, Okla.—Analysis, 80% $CaCO_3$, 3% $MgCO_3$; 100% thru 4 mesh	.50
Kansas City, Mo., Corrigan Siding—50% thru 100 mesh; bulk	**1.80**
Tulsa, Okla.—90% thru 4 mesh	**.50**

Miscellaneous Sands

Silica sand is quoted washed, dried and screened unless otherwise stated.

Glass Sand:	
Berkeley Springs, W. Va.	2.25@ 2.50
Cedarville and South Vineland, N. J.—Damp, 1.75; dry	2.25
Cheshire, Mass.—24 mesh, 5.00; 40 mesh, 6.00; 100 mesh	7.00
Columbus, Ohio	1.50@ 1.75
Hancock, Md.—Damp, 1.50; dry	2.00
Mapleton, Pa.	2.25@ 2.50
Mapleton Depot, Pa.	2.50
Massillon, Ohio	3.00
Michigan City, Ind.	.50
Millville, N. J.	2.00
Mineral Ridge, Ohio	2.50
Ottawa, Ill.	1.25@ 1.50
Pacific, Mo.	2.25@ 3.00
Pittsburgh, Pa.—Dry, 4.00; damp	3.00
Ridgway, Pa.	2.50
Rockwood, Mich.	2.75@ 3.25
Round Top, Md.	2.25
Sands, Pa.	2.50
San Francisco, Calif.	3.00@ 3.50
St. Louis, Mo.	2.25@ 3.00
Thayers, Pa.	2.50
Utica, Ill.	1.25@ 1.50
Zanesville, Ohio	2.50
Foundry Sand:	
Albany, N. Y. — Molding fine, brass molding	3.00
Molding coarse	2.75
Sand blast	4.50
Arenzville, Ill.—Molding fine	**1.50@ 1.75**
Brass molding	1.75
Beach City, Ohio.—Core, washed and screened	**2.00@ 2.50**
Furnace lining	**2.50@ 3.00**
Molding fine and coarse	**2.25@ 2.50**
Cheshire, Mass.—Furnace lining, molding fine and coarse	**5.00**
Sand blast	**5.00@ 8.00**
Stone sawing	**6.00**
Cleveland, Ohio—Molding coarse	1.50@ 2.00
Brass molding	1.50@ 2.00
Molding fine	1.50@ 2.25
Core	1.25@ 1.50

(Continued on next page)

Wholesale Prices of Sand and Gravel

Prices given are per ton, f. o. b. producing plant or nearest shipping point

Washed Sand and Gravel

City or shipping point	Fine Sand, 1/10 in. down	Sand, ¼ in. and less	Gravel, ½ in. and less	Gravel, 1 in. and less	Gravel, 1½ in. and less	Gravel, 2 in. and less
EASTERN:						
Ambridge and So. Hts., Pa.	1.25	1.25	1.15	.85	.85	.85
Buffalo, N. Y.	1.10	.95			.85	
Erie, Pa.		1.00		1.25		1.75
Farmingdale, N. J.	.48	.48	.75		1.10	
Machias, N. Y.	.85	.75	.75	.75	.75	.75
Pittsburgh, Pa.	1.25	1.25	1.00	1.00	.85	.85
Washington, D. C.—Rewashed, river	.75	.75	1.60	1.40	1.20	1.20
CENTRAL:						
Columbus, Ohio	.75	.75@1.10	.75	.75@1.00	.75@1.00	.75
Covington, Ind.	.75	.75	.75	.75	.75	.75
Des Moines, Iowa	.50	.50	1.25	1.60	1.60	1.60
			Unwashed ballast, .50 ton			
Attica, Ind.	.75	.75	.75	.75	.75	.75
Eau Claire, Wis.		.53d				.93@ .98d
Elkhart Lake, Wis.	.60	.50	.60	.70	.70	.70
Grand Rapids, Mich.		.50		.80		.70
Hamilton, Ohio		**1.00**			**1.00**	
Hersey, Mich.		.50				.75
Indianapolis, Ind.	.60	.60		1.50	.75@1.00	.75@1.00
Janesville, Wis.		.65@ .75			.65@ .75	
Mason City, Iowa	1.00	.45@ .55	1.45@1.55	1.45@1.55	1.45@1.55	1.45@1.55
Mankato, Minn.	.40a	.40	.50†		1.25	
Milwaukee, Wis.	**1.11**	**1.11**	**1.36**	**1.36**	**1.36**	**1.36**
Moline, Ill.	**.60**	**.60**	**Concrete gravel, 40% G., 60% S., .90**			
Palestine, Ill.	.75	.75	.75	.75	.75	.75
St. Louis, Mo., f.o.b. cars	1.20	1.45	1.65§	1.45		1.45‖
Silverwood, Ind.	.75	.75	.75	.75	.75	.75
Summit Grove, Ind.	.75	.75	.75	.75	.75	.75
Terre Haute, Ind.	.75	.60	.90	.90	.90	.75
Waukesha, Wis.	**.50**	**.50**	**.80**	**.80**	**.80**	**.80**
Winona, Minn.	.40	.40	1.50	1.25	1.10	1.10
			(.05 ton discount 10 days)			
SOUTHERN:						
Brookhaven, Miss.; Roseland, La.		.50		1.00		
Charleston, W. Va.	all sand 1.40 f.o.b. cars		all gravel 1.50 f.o.b. cars			
New Martinsville, W. Va.	1.00	1.00		1.20		.80
WESTERN:						
Baldwin Park, Calif.		.25@ .40	.50@ .80	.50@ .80	.50@ .80	
Crushed Rock			.90@1.10	.65@1.00a	.60@ .90	
Kansas City, Mo.			Kaw river sand .75 per ton f.o.b. plants			
Los Angeles, Calif.	.30	.70	1.35	1.25	1.15	
Pueblo, Colo.	1.10*	.90*		1.75*		1.60*
San Diego, Calif.	.50@.65	.80@.90	1.40@1.50	1.20@1.30	1.00@1.10	1.00@1.10
Seattle, Wash. (bunkers)	1.50*	1.50*	1.50*		1.50*	1.50*
Webb City, Mo. (flint)	.75	.75	.25@ .75b	.85b	1.25c	1.15c

Bank Run Sand and Gravel

City or shipping point	Fine Sand, 1/10 in. down	Sand, ¼ in. and less	Gravel, ½ in. and less	Gravel, 1 in. and less	Gravel, 1½ in. and less	Gravel, 2 in. and less
Boonville, N. Y.	.60@ .80		.55@ .75			1.00
Brookhaven, Miss., Rosel'd, La.	.75	.50			1.25	
Dudley, Ky.‡	1.05	1.05		1.00		
Elkhart Lake, Wis.	.60	.50				
Fishers, N. Y. (filter sand)	.75	.60@ .75		.60		
Gainesville, Texas		.95				.55
Grand Rapids, Mich.				.55		
Hamilton, Ohio					.70	
Hersey, Mich.				.55		
Indianapolis, Ind.			Mixed gravel for concrete work, .65			
Lindsay, Texas	1.10					.55
Mankato, Minn.			Pit run gravel, .50			
Moline, Ill.	.60	.60	Concrete gravel, 50% G., 50% S., 1.00			
Montezuma, Ind.						.60
St. Louis, Mo.						1.55
Summit Grove, Ind.	.50	.50	.50	.50	.50	.50
Waukesha, Wis.	.60	.60	.60	.60	.60	.60
Winona, Minn.	.60	.60	.60	.60	.60	.60
York, Pa.		.95@1.20	(crushed rock)			
Zanesville, Ohio		.60	.60			

*Cubic yd.; † concrete mix; §⅝ in. and less; ‡crushed rock; ‖2½ in. and less; (a) ¾ in. and less; (b) flint chats; (c) crushed flint; (d) from stock pile.

Crushed Slag

City or shipping point	Roofing	¾ in. down	½ in. and less	¾ in. and less	1½ in. and less	2½ in. and less	3 in. and larger
EASTERN:							
Buffalo, N. Y.	2.25	1.25	1.25	1.25	1.25	1.25	1.25
Eastern Penn. and Northern N. J.	2.50	1.20	1.50	1.20	1.20	1.20	1.20
Western Penn.	2.50	1.25	1.50	1.25	1.25	1.25	1.25
CENTRAL:							
Ironton, O.	2.05	1.45	1.45	1.45	1.45	1.45	1.45
Jackson, O.		1.35		1.35	1.35	1.35	1.35
Toledo, O.	1.50	1.35	1.50	1.35	1.35	1.35	1.35
Youngstown, Dover, Hubbard, Leetonia, Struthers, O.	2.00	1.25	1.35	1.35	1.25	1.25	1.25
SOUTHERN:							
Alabama City, Ala.	2.05	.80	1.25	1.15	1.10	.95	.85
Ashland, Ky.		1.55	1.55	1.55	1.55	1.55	1.55
Ensley, Ala.	2.05	.80	1.25	1.15	1.10	.95	.85
Longdale, Goshen, Glen Wilton, Roanoke, Ruesens, Va.	2.50	1.00	1.25	1.25	1.25	1.15	1.15

Lime Products (Carload Prices Per Ton F.O.B. Shipping Point)

	Finishing hydrate	Masons' hydrate	Agricultural hydrate	Chemical hydrate	Ground burnt lime, Blk.	Ground burnt lime, Bags	Lump lime, Blk.	Lump lime, Bbl.
EASTERN:								
Bellefonte, Pa.		10.50*	10.50*	10.50*	9.00		8.50	1.80
Buffalo, N. Y.				12.00				
Berkeley, R. I.			12.00					2.30
Lime Ridge, Pa.							5.00a	
Williamsport, Pa.			10.00				6.00	
York, Pa. (dealers' prices)		10.50	10.50	11.50			8.50	1.65b
CENTRAL:								
Cold Springs, Ohio	12.50	11.00	10.00		9.00	11.00‖	10.00	
Delaware, Ohio	12.50	10.00	9.00	11.00			9.00	1.60
Gibsonburg, Ohio	12.50				9.00	11.00	10.00	
Huntington, Ind.	12.50	11.00	10.00				10.00	1.60c
Luckey, Ohio	12.50‡	11.00	10.00‡					1.60
Marblehead, Ohio		11.00	10.00				10.00	1.60d
Marion, Ohio		11.00	10.00				10.00	1.80†
Mitchell, Ind.		12.00	12.00	12.00	11.00		10.00	1.70c
Sheboygan, Wis.							9.50	10.25g
Tiffin, Ohio					9.00			
White Rock, Ohio	12.50				9.00	11.00		
Woodville, Ohio	12.50‡	11.00‡	9.50‡	11@14.50	9.00	10.50‡	9.00	1.60
SOUTHERN:								
Erin, Tenn.							8.00	1.25
El Paso, Texas							9.00	1.50
Karo, Va.							7.00	1.50
Ocala and Zuber, Fla.	13.00		9.00		11.00		10.00	1.70
Staunton, Va.					7.50	9.00		1.25
WESTERN:								
Colton, Calif.			15.00				19.70	
Kirtland, N. M.							15.00	
San Francisco, Calif.	22.00	22.00	15.00	22.00				2.50
Tehachapi, Calif.							13.00	2.10e

*Paper sacks; †180-lb. net, non-returnable metal barrel; ‡50-lb. paper bags, terms 30 days net, 25c per ton or 5c per bbl. discount for cash in 10 days from date of invoice; ‖ 80-lb. paper bags; (a) F. O. B. kilns; (b) 200 lb. net, 2.65, 300 lb. net; (c) wooden bbl.; (d) wooden, 1.60, steel, 1.80; (e) wooden bbl., steel bbl., 2.20; (f) ton.

Miscellaneous Sands

(Continued from preceding page)

Columbus, Ohio—Core	.50@	2.00
Furnace lining	2.00@	2.50
Molding fine and coarse	1.50@	2.50
Sand blast	3.50@	5.50
Stone sawing	1.50@	1.75
Traction	.50@	1.50
Brass molding	2.00@	3.00
Delaware, N. J.—Molding fine		2.00
Molding coarse		1.90
Brass molding		2.15
Dunbar, Pa.—Traction (mill)		2.25
Dundee, Ohio.—Glass, core, sand blast traction		**2.50**
Molding fine, brass molding (plus 75c for winter loading)		**2.00**
Molding coarse (plus 75c for winter loading)		**1.75**
Eau Claire, Wis.—Core, roofing sand		1.25
Sand blast		3.25
Franklin, Pa.—Core		**2.00**
Furnace lining		**2.50**
Molding coarse		2.00
Brass molding		2.75
Joliet, Ill.—No. 2 molding sand and loam for luting purposes; milled		.85
Bank run		.65
Kansas City, Mo.—Missouri river core		.80
Kasota, Minn.—Stone sawing (white glass sand)	1.50@	2.00
Mapleton Depot, Pa.—Molding fine	2.25@	2.50
Traction	2.00@	2.25
Roofing sand		2.25
Massillon, Onio—Molding fine, coarse, furnace lining and core		3.00
Traction		2.75
Michigan City, Ind.—Core	.50@	.55
Traction		.40
Millville, N. J. Core		2.00
Mineral Ridge, Ohio—Core		2.25
Furnace lining		1.75
Molding fine and coarse, roofing sand, sand blast, stone sawing		2.00
Traction		1.85
Montoursville, Pa.—Core		1.50
Traction		1.25
Brass molding	1.50@	2.00
New Lexington, Ohio—Molding fine		2.75
Molding coarse		2.50
Ottawa, Ill.—Core, furnace lining, steel molding		1.50
Roofing sand	1.50@	4.50
Sand blast		4.50
Ottawa, Minn.—Crude silica sand	.75@	1.00
Pacific, Mo.—Core, furnace lining	1.00@	1.25
Molding fine	.90@	1.00
Stone sawing	1.00@	1.75
Molding coarse	.85@	1.00
Ridgway, Pa.—Core		2.00
Furnace lining, molding fine, molding coarse		1.25
Traction		2.25
Rockwood, Mich.—Roofing sand		3.00
Sand blast		**3.75**
Round Top, Md.—Roofing sand		2.25
Traction		1.75

Miscellaneous Sands

(Continued)

San Francisco, Calif. (washed and dried)—Core, molding fine, roofing sand and brass molding	3.00@	3.5b
(Direct from pit)		
Furnace lining, molding coarse, sand blast		**3.60**
Stone sawing, traction		**2.30**
Tamalco, Ill.—Molding coarse	1.40@	1.60
Thayers, Pa.—Core		2.00
Furnace lining		1.25
Molding fine and coarse		1.50
Traction		2.25
Utica, Ill.—Core, molding fine and coarse, furnace lining	.65@	1.40
Roofing sand, traction		1.25
Sand blast		2.50
Stone sawing	1.25@	1.50
Brass molding	.75@	1.25
Warwick, Ohio—Core, green, 1.75@ 2.00; dry	2.50@	3.00
Furnace lining, green 2.00; dry		3.00
Traction		2.50
Zanesville, Ohio—Molding fine		1.75
Brass molding	1.75@	2.00
Molding coarse		1.50
Furnace lining, molding steel		2.00
Traction		2.50

Talc

Prices given are per ton f.o.b. (in carload lots only), producing plant, or nearest shipping point.

Asheville, N. C.—Best white and 200-mesh (per ton)		8.00
Yellow (per ton)		9.00
Red (per ton)		13.00
Baltimore, Md.—Crude talc (mine run)	3.00@	4.00
Ground talc (20-50 mesh), bags		10.00
Cubes		55.00
Blanks (per lb.)		.08
Pencils and steel workers' crayons, per gross		1.25
Chatsworth, Ga.—Crude talc (grindings		4.50
Ground (80 mesh)		8.00
Ground (150-200 mesh)	8.00@	12.00
Chester, Vt.—Ground talc (150-200 mesh), bulk	8.00@	9.00
Including bags	9.00@	10.00
Emeryville, N. Y.—(325 mesh), bags		14.75
Hailesboro, N. Y.—Ground talc (150-250 mesh), bags		18.00
Henry, Va.—Crude talc (mine run) per 2000-lb. ton	2.75@	3.50
Ground (150-200 mesh), bags	10.00@	14.00
Keeler, Calif.—(150-200 mesh); carloads, 6000-lb. (bags extra)	18.00@	30.00
Los Angeles, Calif.—Crude	15.00@	22.00
Marshall, N. C.—Crude (gray)	4.50@	5.00
Ground (60-80 mesh) (bags extra)	6.50@	7.50
Ground talc (150-200 mesh); bags	8.00@	12.00
Natural Bridge, N. Y.—Ground talc (300-325 mesh), 200 lb. bags	13.00@	15.00
Rochester and East Granville, Vt.—Ground talc (20-50 mesh), bulk	8.50@	10.00
Ground talc (150-200 mesh), bulk	10.00@	22.00
Vermont—Ground talc (20-50 mesh); bags	7.50@	8.50
Ground talc (150-200 mesh); bags	10.00@	16.00
Waterbury, Vt.—Ground talc (20-50 mesh), bulk	7.50@	10.00
(Bags extra)		
Ground talc (150-200 mesh), bulk	10.00@	22.50
(Bags extra)		
Pencils and steel workers' crayons, per gross	1.20@	2.50

Rock Phosphate

(Raw Rock)

Per 2240-lb. Ton

Centerville, Tenn.—B.P.L. 65%, bags		8.50
Bulk		6.50
Gordonsburg, Tenn.—B.P.L. 68-72%	5.50@	6.50
Tennessee—F. O. B. mines, gross ton, unground Tenn. brown rock, 72% min. B.P.L.		5.50
Ottawa, Minn.—All crude silica sand	.75@	1.00

(Continued on next page)

Roofing Slate

The following prices are per square (100 sq. ft.) for Pennsylvania Blue-Clay Roofing Slate, f. o. b. cars quarries:

Sizes	Genuine Bangor, Washington Big Bed, Franklin Big Bed	Genuine Albion	Slatington Small Bed	Genuine Bangor Ribbon
24x12	$10.20	$10.00	$8.10	$7.80
24x14	10.20	10.00	8.10	7.80
22x12	10.80	10.00	8.40	8.75
22x11	10.80	10.50	8.40	8.75
20x12	12.60	10.50	8.70	8.75
20x10	12.60	11.00	8.70	8.75
18x10	12.60	11.00	8.70	8.75
18x 9	12.60	11.00	8.70	8.75
16x10	12.60	11.00	8.40	8.75
16x 9	12.60	11.00	8.40	8.75
16x 8	12.60	11.00	8.40	8.75
18x12	12.60	11.00	8.70	8.75
16x12	12.60	11.00	8.40	8.75
14x10	11.10	11.00	8.10	7.80
14x 8	11.10	10.50	8.10	7.80
14x 7 to 12x6	9.30	10.50	7.50	7.80
	Mediums	Mediums	Mediums	Mediums
24x12	$ 8.10	$8.10	$7.20	$5.75
22x11	8.40	8.40	7.50	5.75
Other sizes	8.70	8.70	7.80	5.75

For less than carload lots of 20 squares or under, 10% additional charge will be made.

(Continued from preceding page)

(Ground Rock)

Wales, Tenn.—B.P.L. 70%	7.75
Per 2000-lb. ton	
Barton, Fla.—Analysis, 50-65% B.P.L.	3.50@ 8.00
Mt. Pleasant, Tenn.—B.P.L. 65%	6.50
Twomey, Tenn.—B.P.L. 65%	6.00@ 6.50

Florida Soft Phosphate

(Raw Land Pebble)

Per Ton

Florida—F. O. B. mines, gross ton, 68/66% B.P.L.	2.25
70% min. B.P.L.	2.50
72% min. B.P.L.	2.75
75/74%	3.75
Jacksonville (Fla.) District	10.00@12.00

(Ground Land Pebble)

Per Ton

Jacksonville (Fla.) District	14.00
Add 2.50 for sacks.	
Morristown, Fla.—26% phos. acid	16.00
Mt. Pleasant, Tenn.—65% B.P.L.	5.75

Fluorspar

Fluorspar—80% and over calcium fluoride, not over 5% silica; per ton f.o.b. Illinois and Kentucky mines	22.00
Fluorspar—85% and over calcium fluoride, not over 5% silica; per ton f.o.b. Illinois and Kentucky mines	23.50

Special Aggregates

Prices are per ton f. o. b. quarry or nearest shipping point.

City or shipping point	Terrazzo	Stucco chips
Barton, Wis., f.o.b. cars		10.50
Chicago, Ill.—Stucco chips, in sacks f.o.b. quarries		17.50
Deerfield, Md. — Green; bulk	7.00	7.00
Easton, Pa.—Slate granules		6.50
Harrisonburg, Va.—Blk. marble (crushed, in bags)	12.50@14.50	12.50@14.50
Ingomar, Ohio (in bags)		6.00@16.00
Mertztown, Pa. (granite) bags, $10.00; bulk		8.00
Milwaukee, Wis. (del.)		16.00@30.00
Newark, N. J.—Roofing granules		7.50
New York, N. Y.—Red and yellow Verona		32.00
Middlebrook, Mo.—Red		25.00@30.00
Phillipsburg, N. J.—Evergreen, bulk	8.00@10.00	8.00@10.00
Creme and royal, bulk	15.00@20.00	15.00@20.00
Red Granite, Wis.		7.50
Sioux Falls, S. D.	7.50	7.50
Tuckahoe, N. Y.—2000 lb.		8.00@12.00
Whitestone, Ga.—White marble chips, net ton in bulk, f.o.b. cars, granite	4.50@ 6.00	4.50@ 6.00

Concrete Brick

Prices given per 1000 brick, f.o.b. plant or nearest shipping point.

	Common	Face
Appleton, Minn.	22.00	25.00@35.00
Ensley, Ala. ("Slagtex")	11.50	22.50@33.50
Friesland, Wis.	21.00	32.00
Omaha, Neb.	18.00	30.00
Portland, Ore. (Del.)	21.00	45.00@55.00
Puyallup, Wash.	20.00	30.00@75.00
Rapid City, S. D.	18.00	25.00@40.00
Watertown, N. Y.	18.00@21.00	32.00@35.00
Wauwatosa, Wis.	15.00@16.00	28.00@65.00

Sand-Lime Brick

Prices given per 1,000 brick f. o. b. plant or nearest shipping point, unless otherwise noted.

Barton, Wis.	10.50
Boston, Mass.	15.00@16.50
Dayton, Ohio	13.50
Grand Rapids, Mich.	11.00
Lancaster, N. Y.	13.00
Michigan City, Ind.	11.00
Milwaukee, Wis. (delivered)	14.00
Plant City, Fla.	10.00@15.00
Portage, Wis.	15.00
Rives Junction and Saginaw, Mich.	12.00
San Antonio, Tex.	12.50@14.00
Syracuse, N. Y. (delivered at job)	20.00
F.o.b. cars	15.00@16.00

Gray Klinker Brick

El Paso, Texas	13.00

Lime

Warehouse prices, carload lots at principal cities.

	Hydrated, per Ton Finishing	Common
Atlanta, Ga.	22.50	14.00
Baltimore, Md.	24.25	17.85
Cincinnati, Ohio	16.80	14.30
Chicago, Ill.	20.00	20.00
Dallas, Tex.	20.00	.....
Denver, Colo.	24.00	.....
Detroit, Mich.	20.00	19.00
Minneapolis, Minn. (white)	25.50	21.00
Montreal, Que.	21.00	21.00
New York, N. Y.	18.20	13.10
St. Louis, Mo.	19.00	19.00
San Francisco, Calif.	22.00	.....
Seattle, Wash. (paper sacks)	24.00	.....

Portland Cement

Prices per bbl. and per bag net in carload lots.

	Per Bag	Per Bbl
Atlanta, Ga.	.....	2.60
Boston, Mass.	.....	2.43@2.63
Buffalo, N. Y.	.....	2.38@2.48
Cedar Rapids, Iowa	.60	2.40
Cincinnati, Ohio	.59¼	2.37
Cleveland, Ohio	.59¾	2.39
Chicago, Ill.	.55	2.20
Columbus, Ohio	.....	2.44
Dallas, Texas	.50	2.00
Davenport, Iowa	.57¼	2.29
Dayton, Ohio	.....	2.41
Denver, Colo.	.63¼	2.55
Detroit, Mich.	.60	2.40
Duluth, Minn.	.54¼	2.25
Indianapolis, Ind.	.57¾	2.31
Kansas City, Mo.	.56¾	2.37
Los Angeles, Cal. (less 5c dis.)	.68	3.08
Memphis, Tenn.	.....	2.60
Milwaukee, Wis.	.58¾	2.35
Minneapolis, Minn.	.60½	2.42
Montreal, Canada (sks. 20c ext.)	.....	2.25
New Orleans, La.	.....	2.90
New York, N. Y.	.....	2.25
Philadelphia, Pa.	.....	2.41
Phoenix, Ariz.	.82½	3.30
Pittsburgh, Pa.	.54¾	2.19
Portland, Ore.	.....	3.05
San Francisco, Cal.	.....	2.61
St. Louis, Mo.	.55	2.20
St. Paul, Minn.	.60½	2.42
Seattle, Wash. (10c bbl. dis.)	.....	2.90
Toledo, Ohio	.60	2.40

NOTE—Add 40c per bbl. for bags.

Mill prices f. o. b. in Carload Lots to Contractors

	Per Bag	Per Bbl.
Buffington, Ind.	.46¼	1.95
Concrete, Wash.	.....	2.60
Dallas, Texas	.....	2.05
El Paso, Tex.	.70	2.08*
Hannibal, Mo.	.....	1.95
Hudson, N. Y.	.....	2.05
Leeds, Ala.	.....	1.95
Los Angeles, Calif.	.....	2.65
Louisville, Ky.	.....	2.35
Northampton, Pa.	.....	1.95
Phoenix, Ariz.	.....	4.30†
Steelton, Minn.	.50	2.00
Universal, Pa.	.48¾	1.95

*Gross, 10c sacks and 10c per bbl. disc 10 days
†Gross, 15c sacks and 5c per bbl. disc. 10 days.

Gypsum Products— CARLOAD PRICES PER TON AND PER M SQUARE FEET, F. O. B. MILL

	Crushed Rock	Ground Gypsum	Agricultural Gypsum	Stucco* Calcined Gypsum	Cement‡ and Gauging Plaster	Wood Fiber	White§ Gauging	Sanded Plaster	Keene's Cement	Trowel Finish	——Plaster Board—— ¼"x32x36" Weight 1500 lb. Per M Sq. Ft.	⅜"x32x36" Weight 1850 lb. Per M Sq. Ft.	Wallboard, ⅜"x32 or 48" Lengths 6'-10', 1850 lb. Per M Sq. Ft.
Black Hawk, S. D.	3.50	.....	7.00	8.00	10.00	10.50	.....	.....	.....	.....	.....	.....	.....
Denver, Colo.	.....	.....	.....	11.80	.....	.....	.....	.....	.....	.....	.....	.....	.....
Douglas, Ariz.	.....	6.00	6.00	.....	13.00	.....	.....	.....	.....	.....	.....	.....	.....
Fort Dodge, Iowa	3.00	3.50	6.00	8.00	10.00	10.50	20.00	.....	21.30	20.00	20.00	.....	30.00
Garbutt, N. Y.	.....	.....	6.00	8.00	10.00	10.00	.....	7.00	.....	.....	.....	20.00	.....
Grand Rapids, Mich.	3 00	.....	5.00	10.00	10.00	10.00	.....	.....	31.00	.....	19.75	20.00	30.00
Hanover, Mont.	4 50	.....	6.00	10.00	——	10.50	.....	.....	.....	.....	.....	.....	.....
Mound House, Nev.	.....	8.50	6.50	10.50@11.50	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oakfield, N. Y.	3.00	4.00	6.00	8.00	10.00	10.00	20.20	7.00*	30.75	21.00	19.37	20.00	30.00
Portland, Colo.	.....	.....	.....	10.00	.....	.....	.....	.....	.....	.....	.....	.....	.....
San Francisco, Calif.	.....	.....	.....	16.40	.....	.....	.....	.....	.....	.....	.....	.....	.....
Winnipeg, Man.	5.50	5.50	7.00	13.50	15.00	15.00	.....	.....	.....	.....	28.50	.....	35.00

NOTE—Returnable Bags, 10c each; Paper Bags, $1.50 per ton extra (not returnable).
*Sanded Wood Fiber $2.50 per ton additional.

New Machinery and Equipment

Link-Belt's New Vibrating Screen

THE success of some of the earlier forms of mechanical and electrical vibrating screens has led to the development of a number of new machines of this type, descriptions of which have appeared in these pages from time to time.

The latest of these is put out by the Link-Belt Co., and the design has some remarkably good features. It is the work of Prof. G. A. Overstrom, for many years dean of the Utah College of Mines and well known for his research work in screening classification and concentration.

In providing a means of vibrating the screen surface Prof. Overstrom adapted the unbalanced pulley which has served so well as a vibrating device for his concentrating table. This is one of those devices that is fascinating on account of its simplicity. There are no cams, eccentrics, rods or other bearing parts, there is just a pulley with counterweights that may be changed to give a greater or less vibration.

The mounting of the screen is also noteworthy. It is suspended from two hollow cross shafts the ends of which are carried on flat spiral springs, like clock springs. The effect of this mounting is to reduce the effect of vibration on the frame and supports to a minimum.

The screen cloth is mounted so that it may be stretched to the proper tension by tightening bolts provided for the purpose. The screen box may be arranged for one, two or three decks depending on the number of sizes of material that are wanted.

The effect of this method of vibrating the entire screen and its mounting is that there are no dead areas or zones of varying intensity. As the screen is belt driven it can be used at any place where there is a small amount of power available. Lubrication of the moving parts is through the hollow stationary shaft on which the unbalanced pulley is hung.

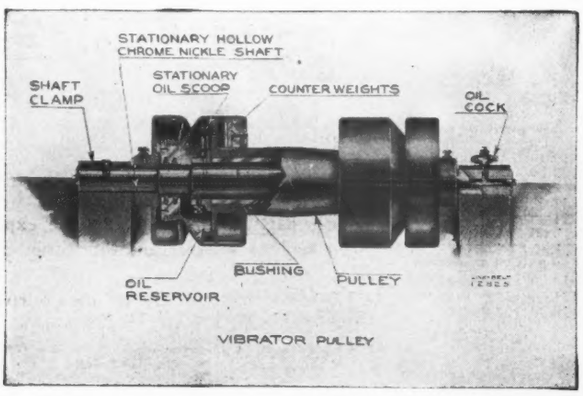
The machine is especially adapted to screening the fines sizes. It may be enclosed to prevent dusting.

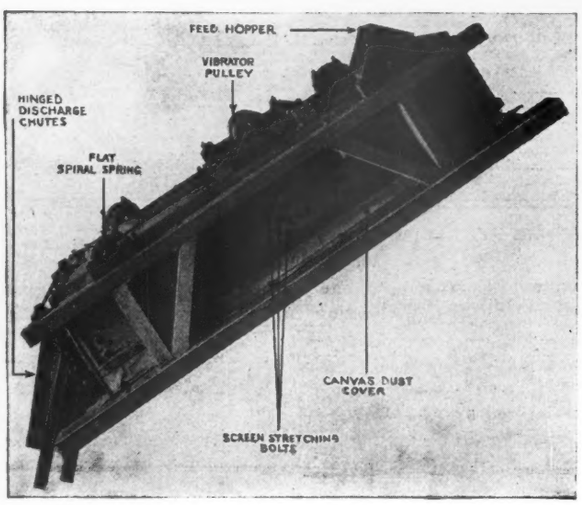
New Development in Metal Cutting Torches

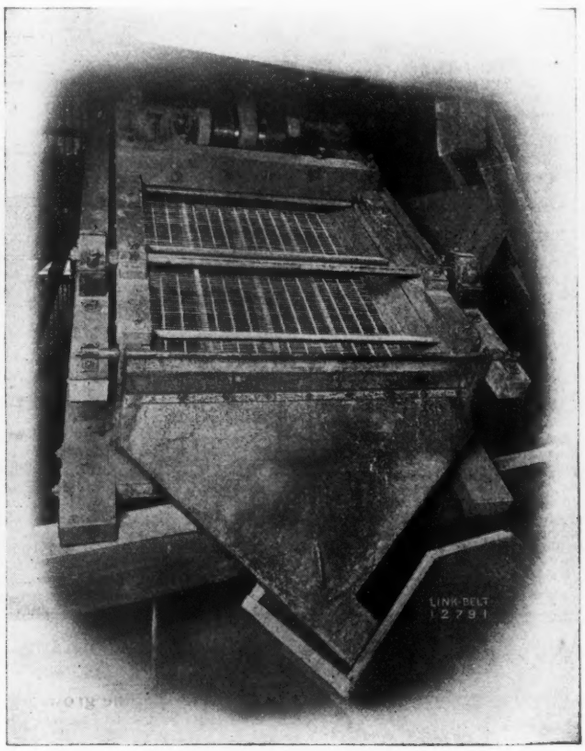
AN important advance in the art of oxy-acetylene cutting apparatus has been recently perfected by The Alexander Milburn Co., Baltimore, Md.

This is the perfection of a "Super Tip" for cutting. The distinctive features of this tip are a method of "Super-mixing" the gases and preheating the cutting oxygen as well as giving added velocity and penetration to the preheating and cutting jets. A further feature is that the tip is provided with a renewable seat at a fraction of the cost of a complete tip, rendering it unnecessary to re-machine or discard the used tips. This renewable seat facilitates the cleaning and maintenance of the tip. In the standard tip the seat could be refaced by taking a thin cut off of it in a high speed lathe, but if the lathe is not available the seat cannot as readily be refaced.

The new tip retains all the advantages of the tip which has been standard on Milburn torches for a number of years, with







Details of a new vibrating screen—Upper left-hand corner view shows partial cross-section through vibrator pulley, showing assembly of pulley; lower left-hand corner shows assembled three-deck screen; right hand shows view of screening surface

the added advantages noted above. The mixture of the preheating gases takes place in multiple passages in the renewable seat. These gases then pass into an annular passage where they are given a swirling motion and an additional mixing. The gases are again separated and expanded into enlarged multiple passages leading to the orifices in the tip proper. Here the preheating flames are projected with an increased velocity inclined toward the high pressure oxygen jet resulting in a speedier cut, a narrower kerf and a material saving in gases.

On rigid cutting tests which have been conducted the following economies in the use of this "Super-tip" over standard tips have been obtained:

Time	17.5%
Oxygen	10.9%
Acetylene	25.0%

Totaling a saving of approximately 18% in the cost of operation.

The "Super-tip" with renewable seat is interchangeable with all sizes of Milburn cutting tips and will fit all this company's torches manufactured since 1916.

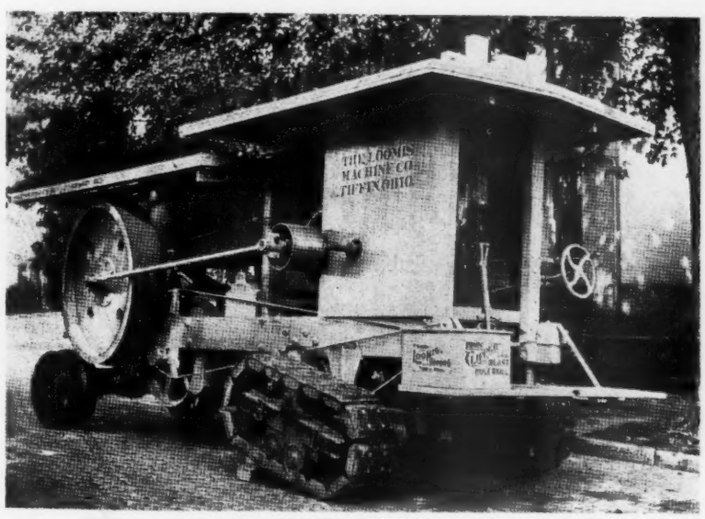
Loomis "Clipper" Blast Hole Drill on Crawlers

THE above cut shows the new type "Clipper" blast hole drill, with crawler type traction rear wheels, supplying the want for a machine required to go over soft ground or where a wide and long traction surface is desired.

The crawler wheel allows the weight at the point of traction to be distributed over a large surface, thus greatly avoiding the "digging in" when power is applied to push the machine forward; also eliminiating "wallowing" when striking a mud hole. Every experienced operator who has run a traction device appreciates the advantage this offers.

According to the manufacturers of this machine, the Loomis Machine Co., Tiffin, Ohio, "it has two speeds for moving—a slow speed for bad and soft places where desired, and a faster speed for ordinary travel. Aside from this, it has a variable speed engine which can be run at such suitable speed as may be desirable on either the low or the high gear.

"This machine has a new-style patented and improved loose crank which starts and stops the tools instantly by the mere push of a lever, patent wheel rests and patent rope saver. It is simple, durable, effective, easily and cheaply maintained, easily operated, is built with low point of gravity. It is furnished with ample horse power to do anything that should be expected of a machine of this type."



Loomis "Clipper" drill or crawler treads

The growth and development of crawler treads on equipment used in the quarry industry is quite remarkable. Quarry operators are becoming quite familiar with crawler treads on steam shovels. The term "caterpillar tread" is covered by patent rights of a certain tractor manufacturer. Hence the use of the more general term "crawler" treads.

New Protected Locomotive

THE locomotive shown in the picture is one of two especially designed for the plant of the Goodwin-Gallagher Sand and Gravel Corp., at Port Washington, L. I., New York. This company, with headquarters in New York City, is among the largest producers of sand and gravel in the United States.

The locomotive has a height of 8 ft. 3 in. in order to run under the bins of a washing plant. From these bins there is a continual drip of salt water, as the sand and gravel is dredged along the north shore of Long Island, so a canopy of monel metal (made of nickel, copper and iron) which is non-corroding, was placed over the boiler. The cab is also roofed with the same metal.

New saddle tank locomotive, made by the H. K. Porter Co.

The protection was even carried to the moving parts of the machine, the exposed pipes, such as injector and lubrication pipes being made of copper.

These locomotives are of the 4-driving-wheel saddle-tank type. The cylinders are 11x16 in. and the track gage is 36 in. They were built by the H. K. Porter Co. of Pittsburgh, Pa.

Progress on Two New Cement Plants

GORDON SMITH, secretary of the J. C. Buckbee Co., of Chicago, consulting engineers for the Pittsburgh Plate Glass Co., advises that work is progressing nicely on the new 3000 bbl. cement plant that company is building at Zanesville, Ohio.

The J. C. Buckbee Co. of Chicago, consulting engineers for the Pacific Portland Cement Co. of San Francisco, Calif., state that work on that company's new cement plant near Redwood City, Calif., is well under way. J. C. Buckbee, president of the J. C. Buckbee Co., has just returned from California, where he has spent about six weeks.

News of All the Industry

Incorporations

Pacific Sand Co., Portage, Wis. Increase and change stock.

Walroof Cement Tile Co., Los Angeles, Calif., —Capital, $100,000.

Marquette Gravel and Construction Co., Marquette, Kan., $25,000.

California Gypsum Corporation of Delaware; $3,000,000; E. Craig, Wilmington, Del.

Mapleton Limestone Co.; capital stock, $10,000; treasurer, W. B. Simpson, Huntingdon, Pa.

Western Indiana Gravel Co., Lafayette, Ind., has increased its capital stock from $500,000 to $630,000.

Redstone Limestone and Coal Co.; capital stock, $80,000; treasurer, John Branick, Star Junction, Pa.

Capital Concrete Co. has been incorporated in Columbia, S. C., by Frank N. Enlich and W. J. Hicklin.

Iron Mountain Gravel Co. of El Dorado, Ark., has been incorporated for $36,000, by P. Jones, Irvin A. Strauss and Waite H. Squirer.

Southwestern Lime Co. has been incorporated in Benbrook, Texas, with a capital stock of $25,000, by W. H. Slay, U. M. Simon and M. E. Smith.

Denver Concrete Rock Co. has been incorporated in Denver, Colo., with a capital stock of $50,000, by J. D. Laverty, W. Forsythe and J. D. Farnsworth.

Construction Material Co. has been incorporated, with a capital of $200,000, in Milwaukee, Wis., by J. Sensibar, R. Chittenden and others, and will handle, sand, gravel, etc.

Grays Harbor Cement Products Co. has been incorporated in Aberdeen, Wash., with a capital of $20,000, by R. O. Howard, W. F. Paddock and Earl Bracken.

Memphis Lime and Cement Co., Shelby county, Tenn., capitalized at $50,000, with Henry Wurzburg, Herman Harris, Blanche Wurzburg, W. T. McLain and L. D. Bejach, incorporators.

Blair Granite Quarries has been incorporated in Ashland, Ore., with a capital of $100,000, by W. M. Blair, E. A. Hicks and P. M. Kershaw, and succeeds the business of W. M. Blair.

Indiana Stone Products Co., Indianapolis; capital, $25,000; to operate quarries and crushed stone plants; directors, C. F. Kreis, G. H. Harris, C. A. Bates, M. G. Keene, W. C. Reinheimer.

Boston Trap Rock Co., Boston. Filed February 20, 1914, $1000; 10 shares $100 each. President, Evangeline Pendleton; treasurer, J. Marie Forbes, Somerville, and Marion L. Monahan.

Watauga Sand and Gravel Co. has been incorporated in Bristol, Tenn., with a capital of $20,000, by F. H. Miller. John T. Moneyhan, A. S. McDowell, Marion L. Moneyhan, and C. C. Etter.

Uniform Mixed Concrete Co., Inc., Los Angeles, Calif., has been incorporated with a capital of $100,000, by Walter L. Stine, Burbank; J. Russell Ellis, Glendale; and M. Cunningham, Los Angeles.

Webster County Quarry Co. has been incorporated in Marshfield, Mo., with a capital of $250,000, by W. J. Hoover of Marshfield and Orville E. Jennings of Springfield, Mo., with others.

Central Mortar and Supply Co., has been chartered in Huntington, W. Va., with a capital stock of $25,000, and will erect a 41x110-ft. plant on 20th street. John D. Greenwade is president; L. A. Wolcott, general manager.

Fillmore-Wiley Co., Los Angeles, Calif., has been incorporated with a capital stock of $100,000, to manufacture concrete and clay products, by H. H. Fillmore and E. F. Wiley of Los Angeles and Max Brown of Venice.

Corona Granite Products Co. has been incorporated with a capital of $50,000, in Los Angeles, Calif., by Charles M. Weinberg, Thomas M. Lipps, Isaac Pacht and Elizabeth Silton, of Los Angeles and Charles H. Urquhart, of Corona.

Vermillion Washed Gravel Co., Perrysville, Ind., capital, $200,000; to deal in gravel and its products; directors, J. W. Hunter, F. E. Scott, R. B. Eagle, R. McCalman, F. E. O'Neil, W. C. Johnson, H. H. Graham, Orville, Shelato, O. A. Myers.

Lyell Avenue Sand and Gravel Co. of the town of Gates, Coldwater, Monroe county, N. Y., to deal in cement, sand and gravel, with a capital of 162 shares of no par value. The directors are J. L. Bonesteele of Coldwater, James Vincelli and George Reeners of Rochester. H. S. Axelford was the attorney.

Slinger Washed Sand and Gravel Co., Milwaukee. $125,000. General contracting and construction business; deal in sand, gravel, stone and building materials. George Czerwinski, 378 16th avenue, Milwaukee; Joseph, Rosenheimer, Slinger, Wis.; M. S. Rousch, 204 Grand avenue, Milwaukee.

Newpoint Stone Co., Batesville, Ind., of which Theodore Wanstrath is one of the directors, has incorporated with a capital stock of $30,000. Associated with Mr. Wanstrath as directors of the company are Myron Freeland, of Newpoint, and Carl Brown, of Greensburg, and the articles of incorporation provide for the quarrying and crushing of stone and manufacturing allied with the stone industry.

Sand and Gravel

H. H. George & Son Construction Co. has erected a gravel plant on a deposit on Chatham Farm near Lynchburg, Va.

National Rock and Gravel Co., Lankershim, Calif., has started its new plant, which has a capacity of 400 tons per 8-hr. shift.

Industrial Sand and Gravel Co., Cache, Okla. (near Guthrie), has begun operations. A local paper states that 100 cars will be loaded daily.

Pine Bluff (Ark.) Sand and Gravel Co. is to double its capacity this year and is building new barges and enlarging the capacity of its unloading plant. W. P. McGeorge, of Pine Bluff, is president of the company.

Great Eastern Gravel Co. employes recently purchased and had installed an Atwater Kent 4-2 radio from Edward C. Barker, and are using the same on the dredge at the harbor mouth, Port Jefferson, N. Y. The men find this a great source of pleasure and education.

Waverly Gravel and Tile Co., Waverly, Iowa, is preparing to increase its capital for the purpose of purchasing additional equipment. A washing and grading plant will be installed, also a concrete products plant for the purpose of utilizing the finer sand, representing an outlay of $20,000 additional to the present plant.

Federal Sand and Gravel Co., at the annual meeting held at Saginaw, Mich., elected C. W. Luce, of East Tawas, president. F. H. Gorey of the New Egyptian Portland Cement Co. was elected general manager, succeeding the late Leet E. Denton. The other officers are: Vice-president, Peter C. Pardee, Reese; secretary-treasurer, S. S. Roby, Saginaw; assistant secretary-treasurer, Miss Olive Owens, Saginaw.

Quarries

Coleman, Texas, has installed a city rock crushing plant.

The Wisconsin Limestone Co., Waukesha, Wis., have moved their offices to the National Exchange Bank Bldg., Waukesha.

Henry Meckley, of Risser's Mill, Pa., will embark in the stone business. He will open and operate the large quarry which was so successfully conducted by his father.

Universal Crusher Co., Cedar Rapids, Iowa, is about to begin the construction of a 60x137-ft. office and factory building to cost about $25,000, on C avenue and Eighth street.

Basalt Rock Co., Napa, Calif., has taken over the quarry formerly operated by the L. J. Alexander Co., and improvements and equipment to cost about $100,000 will be added.

Whiterock Quarries, Bellefonte, Pa., is making extensive improvements and additions to its plant, including a new air compressor and 40 quarry cars. The output of crushed stone will be raised from 10 to 20 cars per day.

Angels Greenstone Co., Angels Camp, Calif., is installing new and larger machinery to meet the growing demand for its product. Instead of taking the green stone from the rock quarry, it is taking it from the shaft and finds that the stone from a depth is of a better quality than that nearer the surface.

Harry Meshbeger of Decatur, Ind., has received an invitation to bid on the crushing of 400,000 tons of stone in the southern Indiana lime quarries, and he probably will go to Bloomington this week to bid on the job. If he is a successful bidder, he will obtain a portable crusher for the work and move his crew of men from the Linn Grove quarry.

Cement

J. W. Collins has engaged in the cement business at 315 Berry street, San Francisco, Calif.

Edison Cement Works, at New Village, N. J., was recently damaged by fire to the extent of $5000.

Lehigh Portland Cement Co. has just completed the drilling of a 1260-ft. well at the plant at Mason City, Iowa.

American Cement Plaster Co., of Fort Dodge, Iowa, has let the contract for a $36,000 plant in Webster City, Iowa.

Northwest Davenport Cement Co., Davenport, Iowa, is about to let the contract for erection of a cement block and stone building to cost $15,000.

P. C. Allen, Nashville, Ark., and others, are interested in organization of a company with a capital stock of $1,000,000 to construct a cement plant at Arkansas.

Linwood Cement Co., Davenport, Iowa, plans the immediate erection of a new mill, with power house, estimated to cost $115,000. Frank Neufeld and A. C. Klindt head the company.

Lehigh, Pa., cement plants will not shut down for repairs as they usually do in March, according to local papers, on account of the unusually heavy demand for cement. All the plants are laying in heavy stocks of coal.

Monolith Portland Cement Co. has work under way on enlargements in its plant, including a number of new buildings with equipment, designed to advance the output to about 3500 bbl. per day. The work will also comprise extensions in the kiln department. At a later date it is expected to make other additions for a further advance in the capacity to about 4500 bbl. daily. Headquarters of the company are in the Hibernian bldg., Los Angeles.

The state railroad commission of California has denied the petition of the Southern Pacific Co. for a rehearing in the case of the Pacific Portland Cement Co. vs. the Southern Pacific Co. in which the commission ruled that the defendant carrier should pay to the complainant reparation against the charges collected for the transportation of crude lime rock moving from Flint to Tolenas during the Federal Guaranty Period, March 1 to August 31, 1920.

Lime

Texas Calcium Arsenate and Lime Co., 611 Amicable building, Waco, Texas, has awarded contract for grading and foundation of lime plant near Leon Junction, Texas.

Southwestern Lime Co., 1216 W. T. Waggoner building, Fort Worth, Texas, is about to establish another kiln at its plant at Benbrook, Texas, and will install an air compressor.

Trade Notes

Howard R. Huntington has been appointed receiver for the Sandusky Cooperage and Lumber Co. and the Ozark Cooperage and Lumber Co.

McMyler-Interstate Co., Cleveland, Ohio, announces the opening of a new branch office at 619 Genesee building, Buffalo, N. Y., in charge of J. E. McFate, Buffalo district representative. The company has moved its Chicago branch office into new quarters at 648 Railway Exchange building.